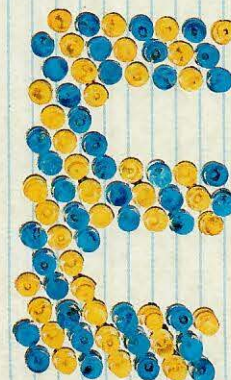
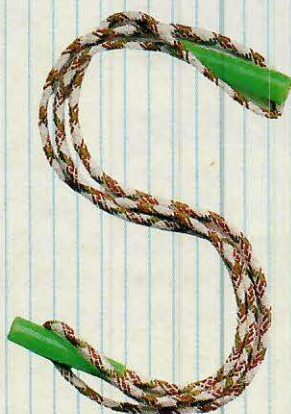
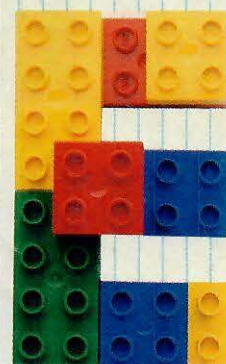
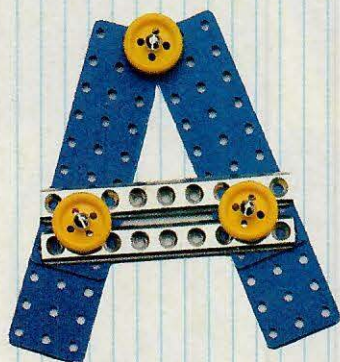
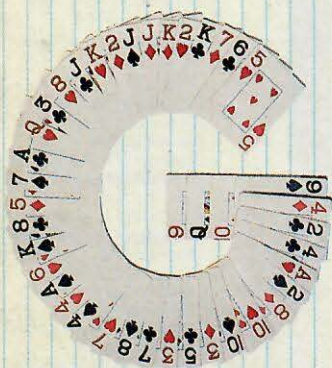
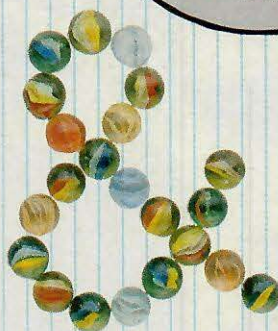
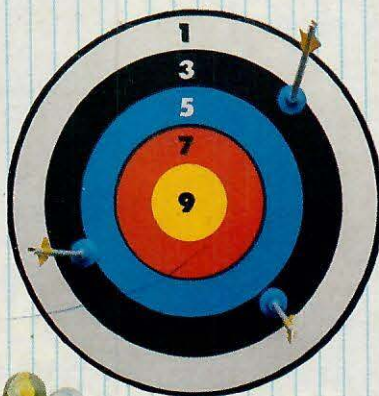
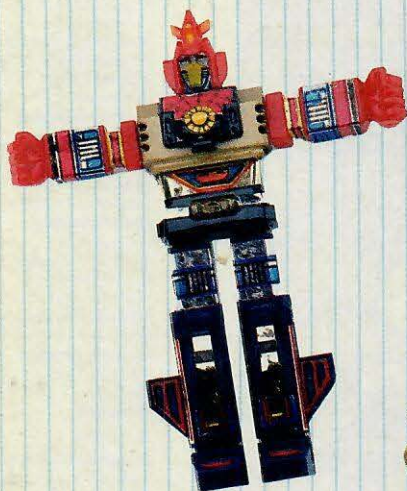


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Video Star Gazing

Do you know your Frogger from your Q-Bert? Here are some of the most popular video game stars. Can you name the character and find out where each belongs? But watch out, it's harder than it looks. So keep your eye on the screen and check out your answers on page 35.

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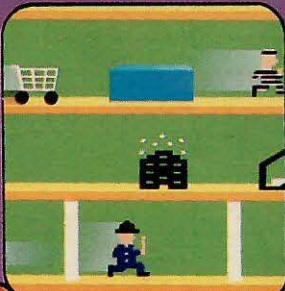
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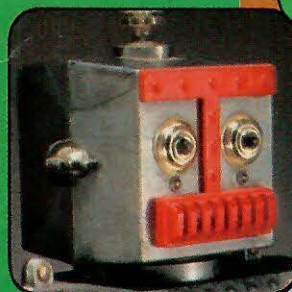
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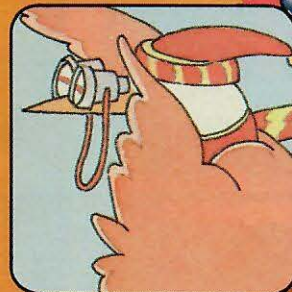
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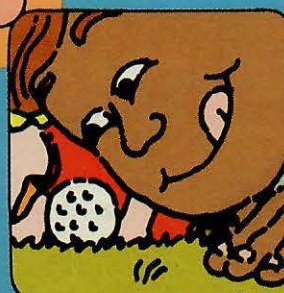
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Cover Photograph by Stan Fellerman Photography

The Wizards of Glen Rock

MEET SOME FOLKS WHO CREATE VIDEO GAMES

Inside the Glen Rock Plaza building in Glen Rock, New Jersey, is a small laboratory. A sign stands guard at the door:

"RESTRICTED AREA—AUTHORIZED PERSONNEL ONLY!"

A visitor can only guess as to what goes on behind that locked door. Are atoms being smashed? Is someone developing a dog that doesn't bite, bark, scratch, or shed?

Upon entering the lab, all fears vanish. Posters of rock stars line the walls. Several offices are stacked with computer equipment worth tens of thousands of dollars. Yet in one of those offices, a folk guitar leans against a chair.

And the scientists? The whole bunch are dressed in jeans and sneakers. They seem to spend half their time smiling, the other half making corny jokes.

Welcome to Activision's East Coast design center. Activision are the people who make those popular computer games like "Crackpots," "H.E.R.O.," and "Keystone Kapers." These fun-loving fellows are the wizards behind those games.

The Inside Story

What does it take to design home video games? There is no magic formula. However, strong computer skills and an interest in electronics don't hurt. Each designer has these skills and interests, although their educational backgrounds are very different.

Alex DeMeo, 21, says his computer education was "self taught." Other designers, like John Van Ryzin, 25, learned about computing while getting a college degree in electrical engineering.

There's a family atmosphere at Glen Rock—and for good reason. Two designers are brothers—Garry Kitchen, 29, and Dan, 23. In addition, John is a brother-in-law of the Kitchens.

The designers are all crazy about games,

sports, and movies. John plays golf. Alex plays softball and the guitar. The Kitchen brothers are James Bond fans. Their love of mysteries provided the idea for some of Dan's games.

Everyone on the staff has a quick sense of humor. On a recent tour of the office, John showed off the main computer room. "Step back," he warned. "I've got to cut off the force field and laser beam."

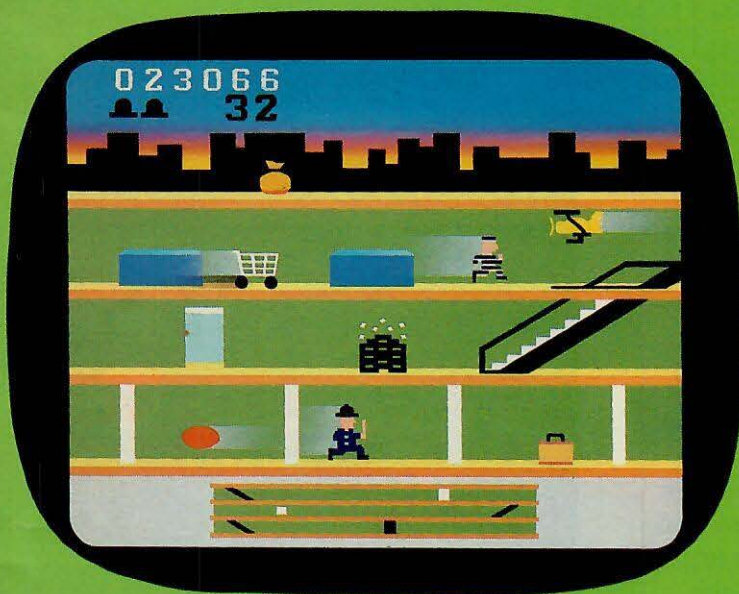
You can see the same wit and humor in some of the more popular games. In Garry's "Keystone Kapers," the store detective is chased and knocked over by whizzing shopping carts. In "Pressure Cooker," a slightly crazy cook must deal with a conveyor belt that spits out hamburgers at an ever-faster rate.



Can you spot the backpack that turns into a helicopter? It's a great way to get around in "H.E.R.O."

by Michael
J. Dayton

"Shopping Carts Gone Crazy"
might be another name for the
video game, "Keystone Kapers."



backpack on him. Then I wondered, 'What should this guy be able to do? Go up? Go down?'"

From those thoughts, "H.E.R.O." was born. John added a rotor blade to the backpack, giving his character the ability to fly like a helicopter. He also gave his character jumping skills.

"From there, it only seemed logical to have him jump off a cliff and fly into a cave below. Of course, he needed to do something once he got inside. I gave him plenty of obstacles to avoid, like snakes and underground streams. And way down on a lower level, I stranded a miner ➡

Below: "One day my office may collapse under the weight of all these printouts!" laughs Garry Kitchen.

How to Make a Computer Game

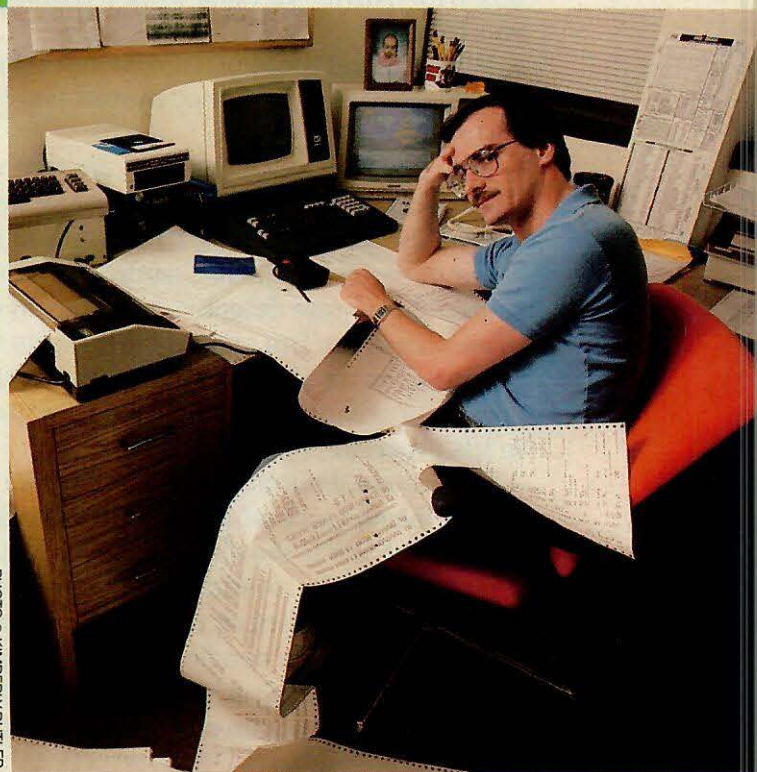
What does it take to create a best-selling computer game? "It's not all fun and games," says John.

Dan agrees. "A good game is one percent idea and 99 percent execution. It's a lot of sweat."

The staff uses all of their abilities when working. The designer must have an active imagination. He or she must understand computers and know how to operate them. Designers have to be pretty good at art to draw the screen characters and background.

John explained the process he followed to come up with his new computer game, "H.E.R.O." (Helicopter Emergency Rescue Operation).

The game took several months from start to finish. He said, "I sat down one day, just fooling around with a computer. I drew a little guy on the screen—he was kind of cute. Next, I put a





Above: Dan Kitchen spends a lot of his time before a TV screen working out the bugs in video games.

who needed rescuing.”

Once he had a plan for his game, John went to work making the characters and background. He used a computer program that allowed him to draw his character one frame at a time. This was done on a computer screen that was divided into lots of boxes. Each box had a number and a letter—kind of like a Bingo card. John filled in each box with a different color until a whole picture was formed.

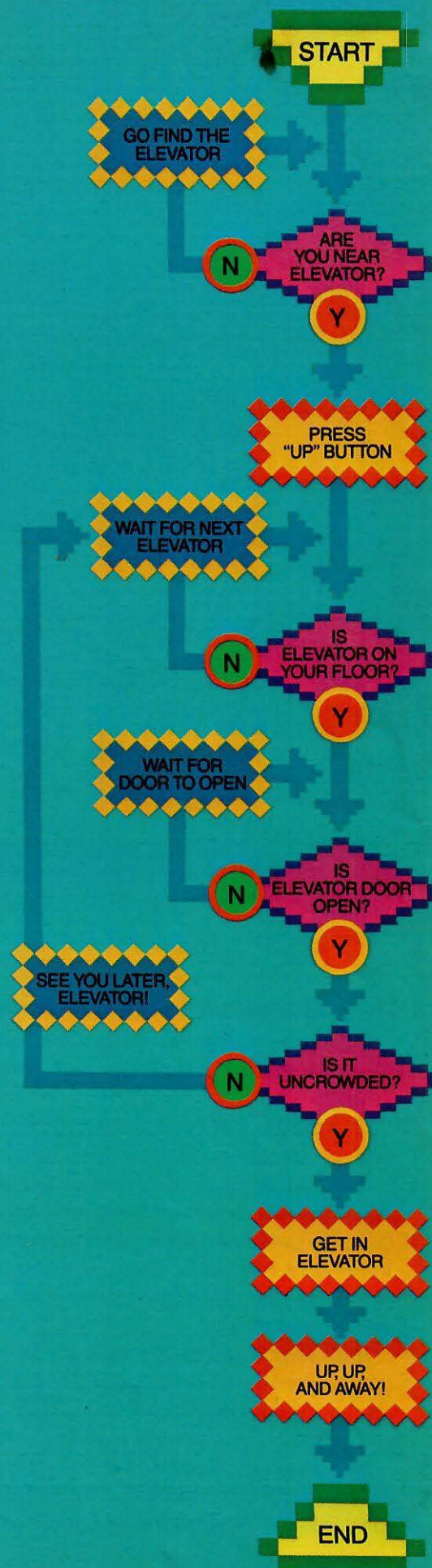
When he put those picture frames together and speeded them up, they moved just like a cartoon.

John also had to write a program that would control the action of the screen characters. Writing that program is a long and involved job.

For example, in Garry's game “Keystone Kapers,” the store detective can take an elevator to another floor. But even something as simple as getting on an elevator can require several computer commands. Garry had to write these in his program.

Is the store detective in the part of the screen where the elevator is? Is he standing at the center of the door? Is the elevator on his floor? Is the door open? Is the joystick pushed up?

“If all these questions can be answered ‘yes,’ then and only then can he get in the elevator,” Garry explained. “So for each bit of action you see, dozens of program steps must be written.”



An Elevating Experience

Garry Kitchen might have drawn a flow chart for the elevator in "Keystone Kapers." In real life, you draw your own mental flow chart each time you ride in an elevator.

Notice that all questions in the boxes must be answered "yes" (Y) before you can get on. If you can't answer "yes" to each question, it's high time you looked for the stairs!



Above: John Van (H.E.R.O.) Ryzin may have his feet up but he's really very busy. He's trying to beat his high score in "H.E.R.O."



Left: Alex DeMeo (right) and Dan Kitchen take a work break by playing guitar and singing.

To help designers keep track of each of these steps, they often use a flow chart. (See box.) This process often demands long hours and many late nights.

Tripping Up the Designers

Thank goodness for the lounge, a small room tucked away in one corner of the office. The lounge is a game player's idea of heaven. It includes a video recorder, a TV and game console with more than 50 cartridges, as well as a full-sized arcade game.

This room serves as an important place in the development of the software. It is here that the games are tested and improved by the designers. John said that when he finished writing each part of "H.E.R.O.," he brought it in the lounge

and showed it on the screen for everyone to play. They looked for any problems that might remain in the program. They also suggested changes.

"We always want to have these games perfect," John says. "So we go through every possible situation that might come up. If we find something that doesn't work, we fix it."

Even so, they get letters from users who catch any mistakes. "The kids love to write and tell us about any bugs they find," Garry says.

When the staff is satisfied, the game is shipped to California. There it is made into game cartridges and sent to stores.

By the time the staff is finished writing, developing, and testing each game, they know it by heart. In fact, they play the games so much that they consider themselves experts.

For any hopeful experts, John offers this advice. "First develop the skills each game requires, such as jumping or flying. Then practice, practice, practice."

Of course, there is one other way. "Send us \$500, and we'll tell you exactly how to win," he laughed. "Oh, by the way," John added. "That's just a joke!"

PHOTOS © KIMBERLY BUTLER

Factoids



A giraffe's tongue is so long that it can be used to clean its ears.

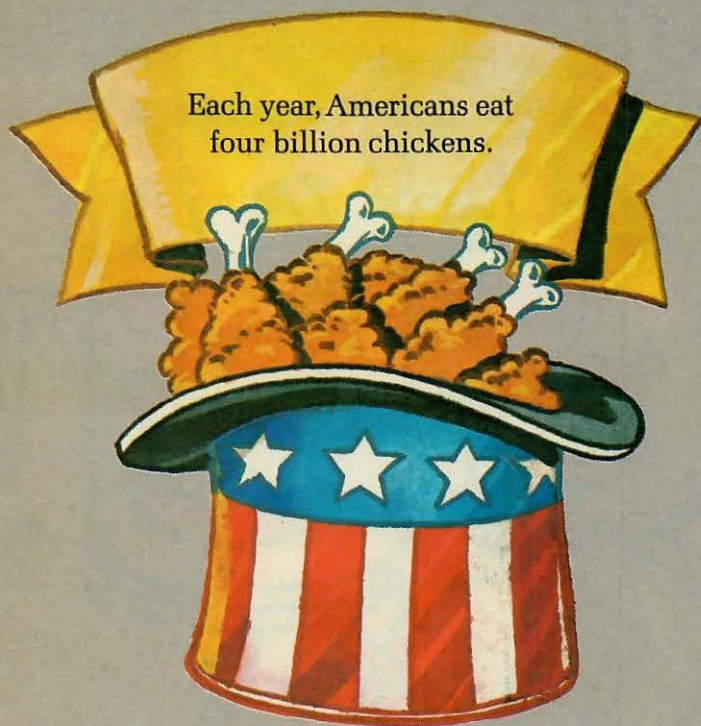


The heaviest hailstone ever found weighed nearly two pounds. It measured almost 17 inches around.



The human body contains enough carbon to make 9,000 pencils.

Each year, Americans eat
four billion chickens.

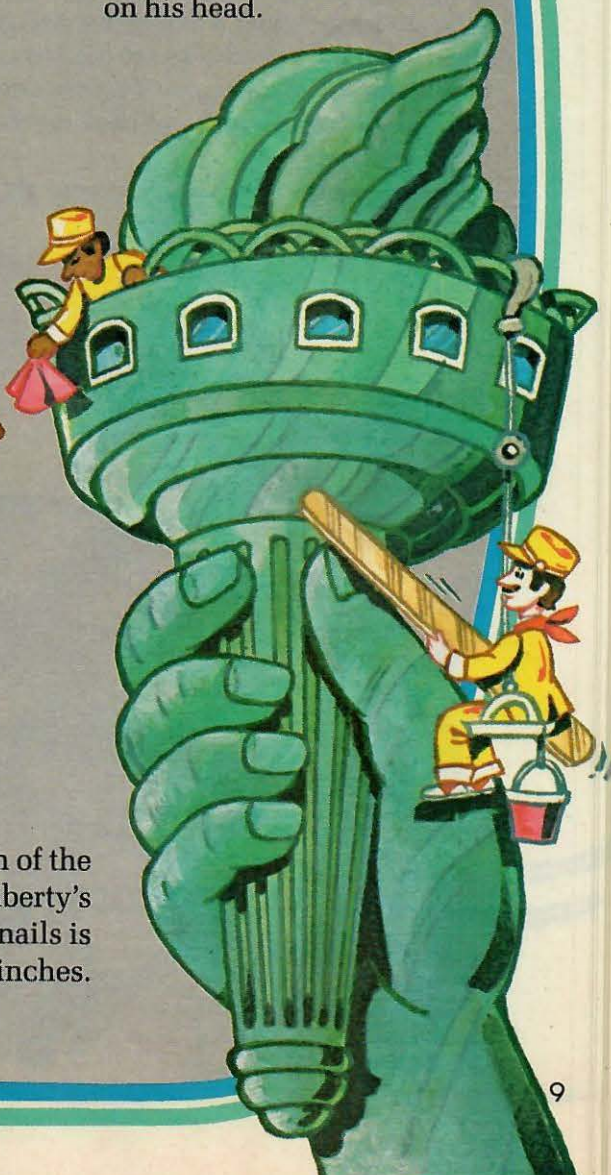


An average person
has about 120,000 hairs
on his head.



A crayfish has
three eyes—two on its head
and one on its tail.

Each of the
Statue of Liberty's
fingernails is
13 inches by 10 inches.



Any Questions?

by Michele Lyons

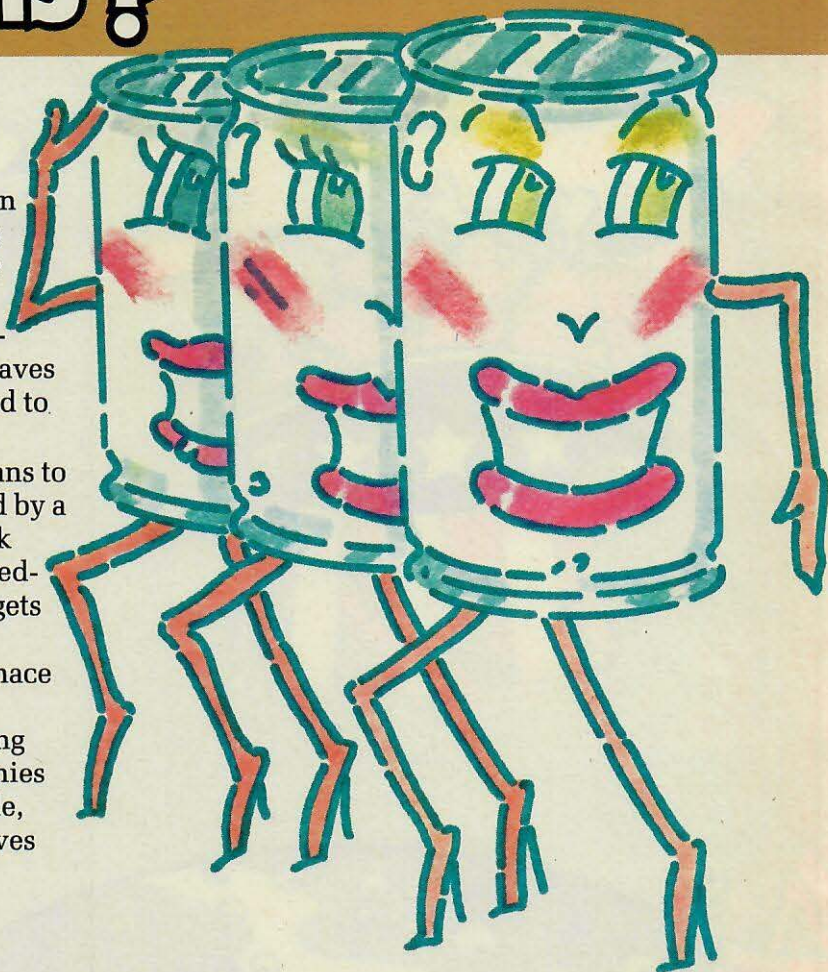
How are cans recycled?

When you finish a soda pop, don't throw away the can! Take it to your local recycling center or food store. You will earn a little money and the can will be recycled. Recycling lets companies turn old cans into new ones. And it saves on energy and material that would be needed to make brand new aluminum cans.

Each day, trucks deliver loads of empty cans to recycling plants. Here, the cans are flattened by a machine and dumped into a truck. The truck takes the cans to a center where they are shredded into popcorn-size pieces. This process gets rid of any leftover dust or liquid.

Next, the shredded cans are fed into a furnace that gets as hot as 1250°F (731°C). The heat softens the metal so it can be formed into long sheets. Later these sheets are sold to companies that make soft-drink cans. The cans are made, refilled with soda, and put back on the shelves in your store!

Question sent in by Mary Kvindlog, Waldo, WI.



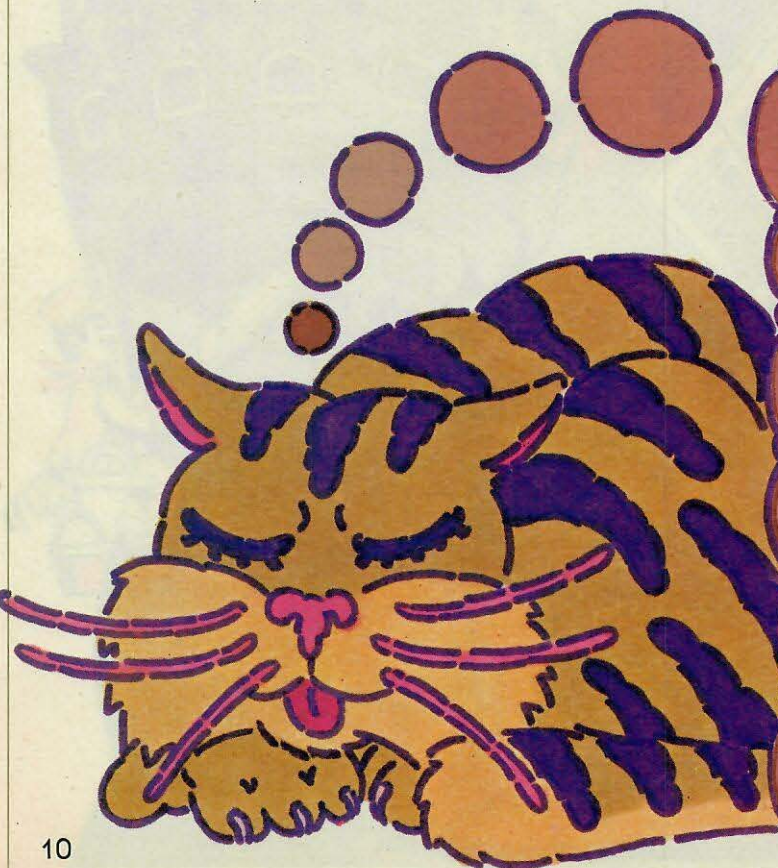
Do animals have dreams?

Nobody knows the answer to this question for sure. After all, animals can't tell us their thoughts. But many scientists think that animals do dream. They base their theory on studies that compare sleeping people to sleeping animals.

When people dream, the nerves in the brain give off electricity in certain patterns. These patterns are called *brain waves*. They can be measured with a special machine while the person sleeps. Scientists also used this machine on cats. And they found the same brain waves in sleeping cats that people have when they dream. This means the cats may have been dreaming, too.

What do animals dream about? That's anybody's guess. They probably dream about the same things they think about when they are awake—food, other animals, and maybe even people!

Question sent in by Kate Steele, Alice, TX.



Do you have a question that no one seems able to answer? Why not ask us? Send your question, along with your name, address, and age, to:

Any Questions?
3-2-1 CONTACT
P.O. Box 599
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How does poison ivy make you itch?

That patch of reddish-brown leaves you touched looked harmless. But it was poison ivy. Now, you're itching and scratching like crazy!

Poison ivy leaves have an oil on them. When you brush against the leaves the oil gets on your skin. If you don't wash it off right away, the oil sinks into your skin. This causes an allergic reaction. Your skin begins to release a substance called histamine (HISS-ta-mein). Your body uses this substance to fight the poison. But the histamine also makes your skin red, swollen, and itchy.

Don't worry though. Your body is making other chemicals besides the histamine to fight the poison. Keeping the rash dry and putting on calamine lotion can give your body a little help in ditching the itching.

Question sent in by Elsie Gonzalez, Brooklyn, NY.



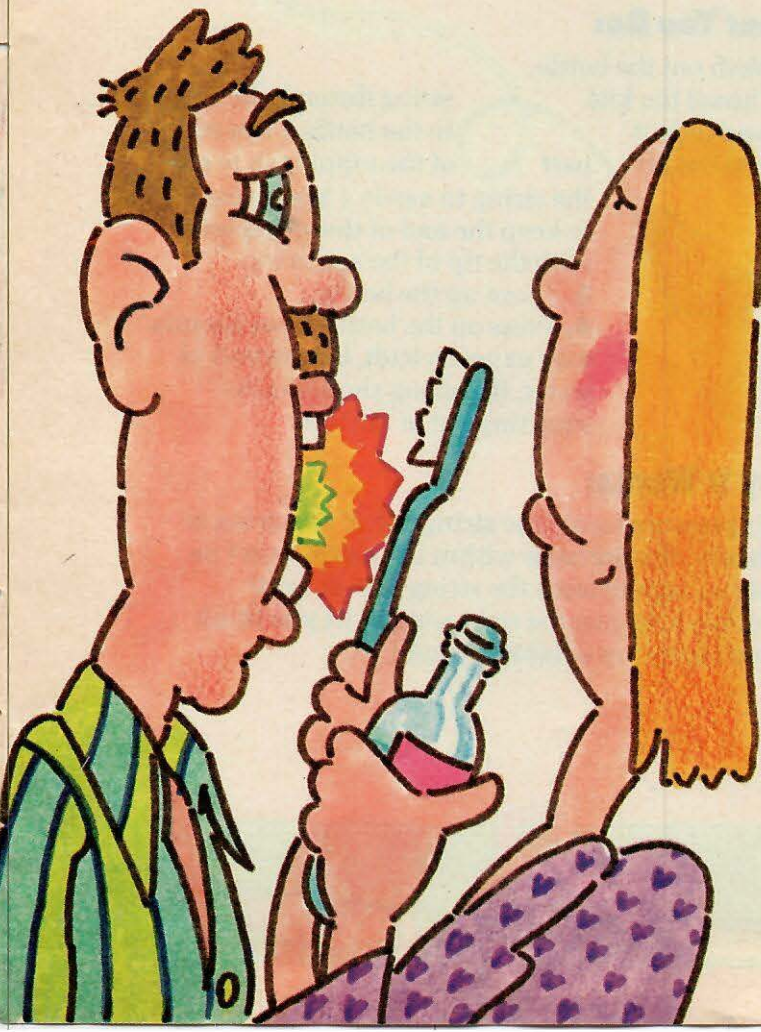
Why do people have bad breath in the morning?

If you leave food in the warm sun for hours, it will start to smell. The same thing can happen in your mouth overnight! Bacteria grow in warm, wet, dark places—like your mouth. The only other thing it needs to grow is food. If you have any pieces of food stuck between your teeth when you go to sleep, bacteria will break them down. This causes decay and a bad smell.

Of course, people can also get bad breath during the day. But while you're awake, your mouth is very active. You swallow more often and gulp away most of the bacteria. Your tongue helps move bacteria out of the way, too.

The best way to fight "morning breath" is to brush your teeth well before you go to bed. That way, you'll get rid of as many food particles as you can. Then brush your teeth again in the morning for an extra-fresh-tasting mouth!

Question sent in by Mark Kaefer, Basking Ridge, NJ.





THE TOY WORKSHOP

by Carolyn Sumners

Here's your chance to wow your friends with some nifty (and cheap) home-made toys. And what's even neater—you can wow the folks with your scientific knowledge. Even the simplest toys have science behind them!

The Little Squirt

Here's a toy that's great on April Fool's Day, but it works just as well any other time of year. It will make your friends duck for cover—until they realize they've been tricked.

What You Need:

- An empty plastic bottle with a "nipple" top (The "honey bear" bottles or ones with similar tops are good for this trick.)
- Some kite string

What You Do:

1. Wash out the bottle.
2. Thread the kite top and hide it have to cut off

string through the squirt in the bottle. (You may of the nipple top to get the string in easily.) Make sure to keep the end of the string level with the tip of the squirt top.

3. Close up the bottle.
4. Press on the bottle. Your friends may expect a bath, but instead of water, the string should come squirting out of the top.

Why It Works:

Air pressure forces the string out. If the string is too heavy, the pressure within the bottle won't be strong enough to force the string out. So your string has to be just the right weight. (If you think it's too heavy, try a lighter string.)

Many Happy Returns

Here's a toy that is a bit more complicated to make, but it's worth it. It'll always come back to you—no matter what.

What You Need:

- An empty oatmeal box (with cover) or an empty 12-ounce soda pop can
- A strong rubber band
- A heavy metal washer
- A nail
- A twist tie (the kind that is used to seal plastic bags)
- Two large paper clips

What You Do:

1. Use the nail to make a hole in the center of the top and bottom of the container.
2. Slip the rubber band through the washer and knot it in the middle of the band. This will keep the washer from moving along the rubber band.
3. Put one end of the rubber band through the hole in the bottom of the container. Secure it with a paper clip. (See drawing.)
4. Using the tie as a hook, pull the rubber band through the hole in the top of the container. Attach it with a paper clip.



5. Decorate your can with contact paper, wrapping paper, decals or whatever you like.

6. Roll the container on a smooth level floor. The can always comes back.

Why It Works:

The container is storing up energy as the washer winds up the rubber band. When the container stops, the rubber band begins to unwind by turning the can backward.



A girl with short dark hair, wearing a green and purple striped shirt and purple pants, is holding a long wooden stick. She is looking down at the stick. To her right, a string with several colorful rings (green, blue, yellow, red, pink) is attached to the stick. The rings are floating in the air. The background is a light blue sky with a green ground at the bottom. There are illustrations of tools (scissors, hammers) along the top and bottom edges of the page.

Hoop Bee-Bo

Here's a toy that was first thought up by Native Americans. It's easy to make—but pretty tricky to work.

What You Need:

- A straight stick about 12 inches long
- Four feet of heavy string
- Seven plastic, rawhide or other lightweight rings

What You Do:

1. Tie one end of the string around the stick.
2. Thread six of the rings on the string.

3. Tie the string to the last ring, so the rings can't fall off.

4. Swing the string and rings. Catch each ring on the stick as it begins to fall. The smaller your rings, the harder they are to catch.

Why It Works:

As you toss the string upward, the rings move until the force of gravity brings them back down.

The Balancing Clown

Here's a toy that will balance on your finger forever—or until you get tired. It all depends on whichever comes first!

You Need:

- A piece of heavy cardboard or oak tag slightly larger than the drawing of the clown
- A pair of scissors
- Two pennies
- Clear tape or glue
- A pen or pencil
- Crayons (if you want)
- Your finger

What You Do:

1. Cut out the figure of the clown from the magazine. (Wait until you've finished reading the issue—please!)
2. Trace the cut-out clown on a piece of cardboard or oak tag. Or just glue CONTACT's clown onto the cardboard.
3. Cut out the cardboard clown. Color it in if you'd like.
4. Balance the clown (head down) on your finger. It will fall off.
5. Now glue or tape a penny on each hand. (See drawing.) The clown will balance forever.

Why It Works

When the clown is balancing on your finger, the pennies make it heavier toward the lower half.

So the heaviest weight is below the head. If there are no pennies, the center of weight is higher up—somewhere around the clown's chest. This throws the balance off.



List of the Month

Name Game Some months of our calendar were named for Roman gods. June was named for Juno, the goddess of marriage. Even today, June is a month when many people get married. The month we're heading into, January, was named for the god Janus. Janus had two faces and protected gates and entrances. Come to think of it, what better name for the month that is the gateway to the new year!

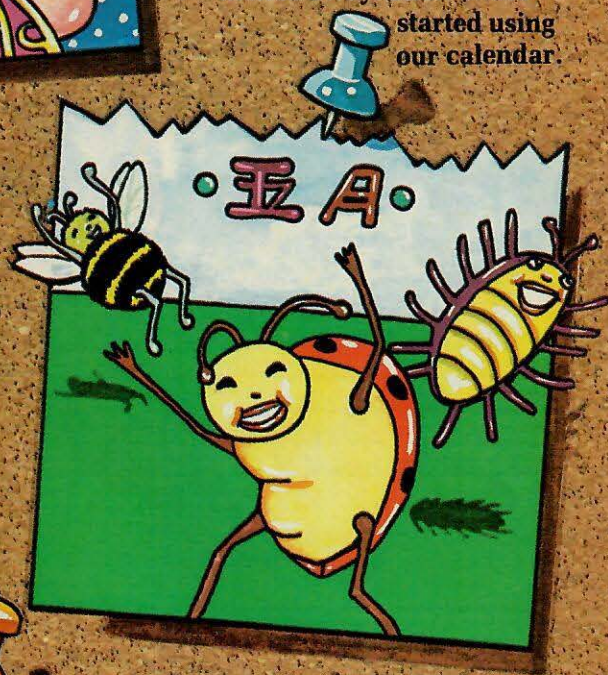


Cold Dew and Little Cold

How would you like to have been born on the 5th of Busy Insects? That was an ordinary day on an old Chinese calendar. The 2,000-year-old calendar had 24 months with names like Rain Water and Clear and Bright. Each month had a long name—but lasted only two short weeks. But in 1912 Heavy Snow melted away. Then China started using our calendar.



Eleven-up Imagine going to sleep on September 2nd and waking up on September 13th! Something like that happened when the American colonists switched calendars in the 1700s. Their calendar was 11 days too long. So in 1752 they cut 11 days out of September. All birthdays had to be changed. Take George Washington. He was born on February 11th. But his birthday moved to the 22nd, where it is now!



Rising Time

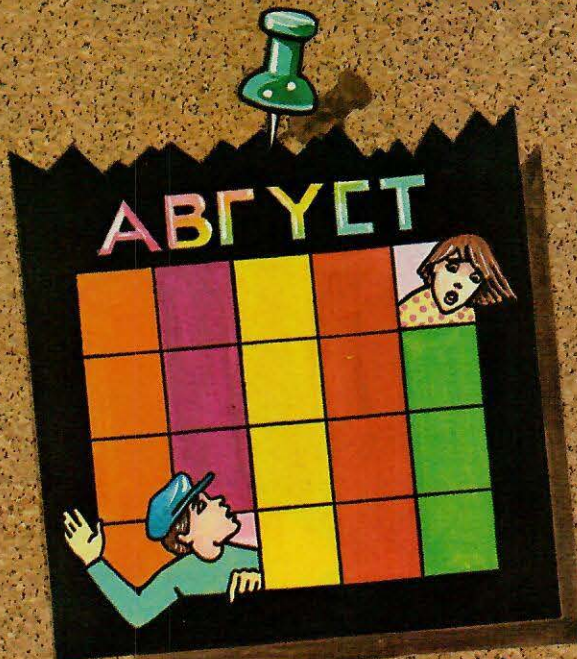
In ancient Egypt, the calendar centered around farming. The year began in July when the Nile River flooded. There were three 4-month seasons: Seed-time, Floodtime, and Harvesttime. Each month had 30 days. But if your math is good you know that adds up to 360 days. Since the year is really 365 1/4 days long, the Egyptians added five days to the end of the year for parties. Not a bad way to end the year!

Calendar Capers

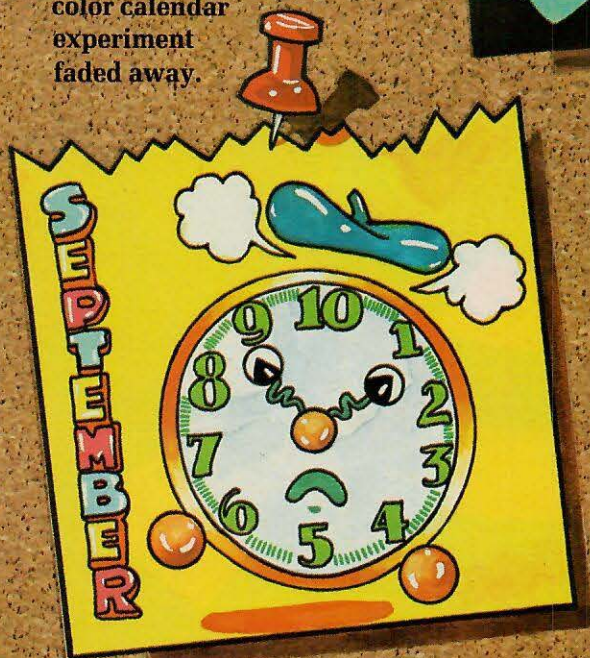
by Renée Skelton

It's time for January, the year's first month. But did you know January was once the next to last month? Or that some calendars start in September? For more crazy calendar facts, keep reading.

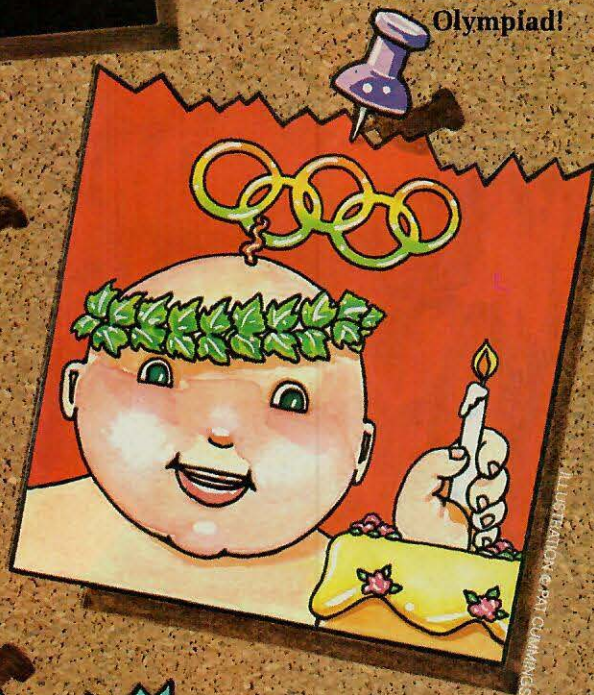
Colorful Calendar In 1929, the Soviet Union came up with a calendar with five-day weeks. Each day was a color: yellow, red, orange, purple, and green. Every worker was given one. That was the day that person got off from work. But if you were a purple and your friend was a green, you'd never get to spend time together. This made people red with anger. So by 1940, the color calendar experiment faded away.



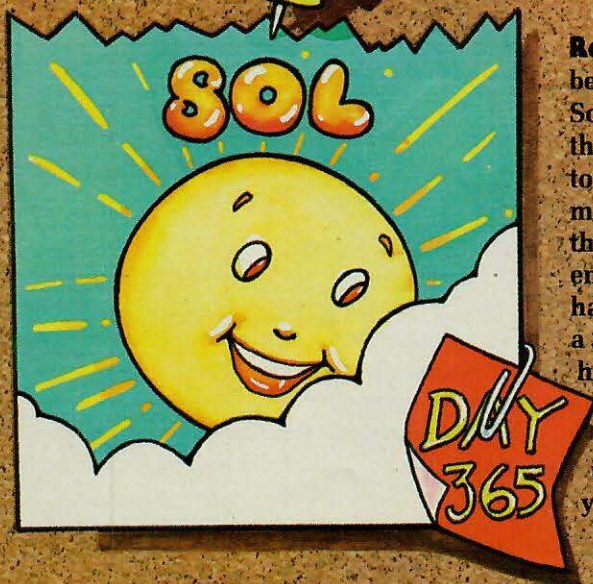
Go Four It What do Olympic games have to do with calendars? Plenty—at least once upon a time. The games, which began in Greece in 776 B.C., were held every four years. Each four-year period between games was an Olympiad. Lots of people counted time back then by Olympiads instead of years. If we still did that today and you were born in 1972, you'd say you were born in the 299th Olympiad!



The 100-Minute Hour How about a calendar with 36 10-day weeks? Each day would have 10 hours. Each hour would have 100 minutes. Each minute would have 100 seconds. Sound weird? Maybe. But people in France tried it in 1792. As if that wasn't enough, the first day of the year was September 22. But the calendar was too confusing. So the French went back to their old calendar in 1806.

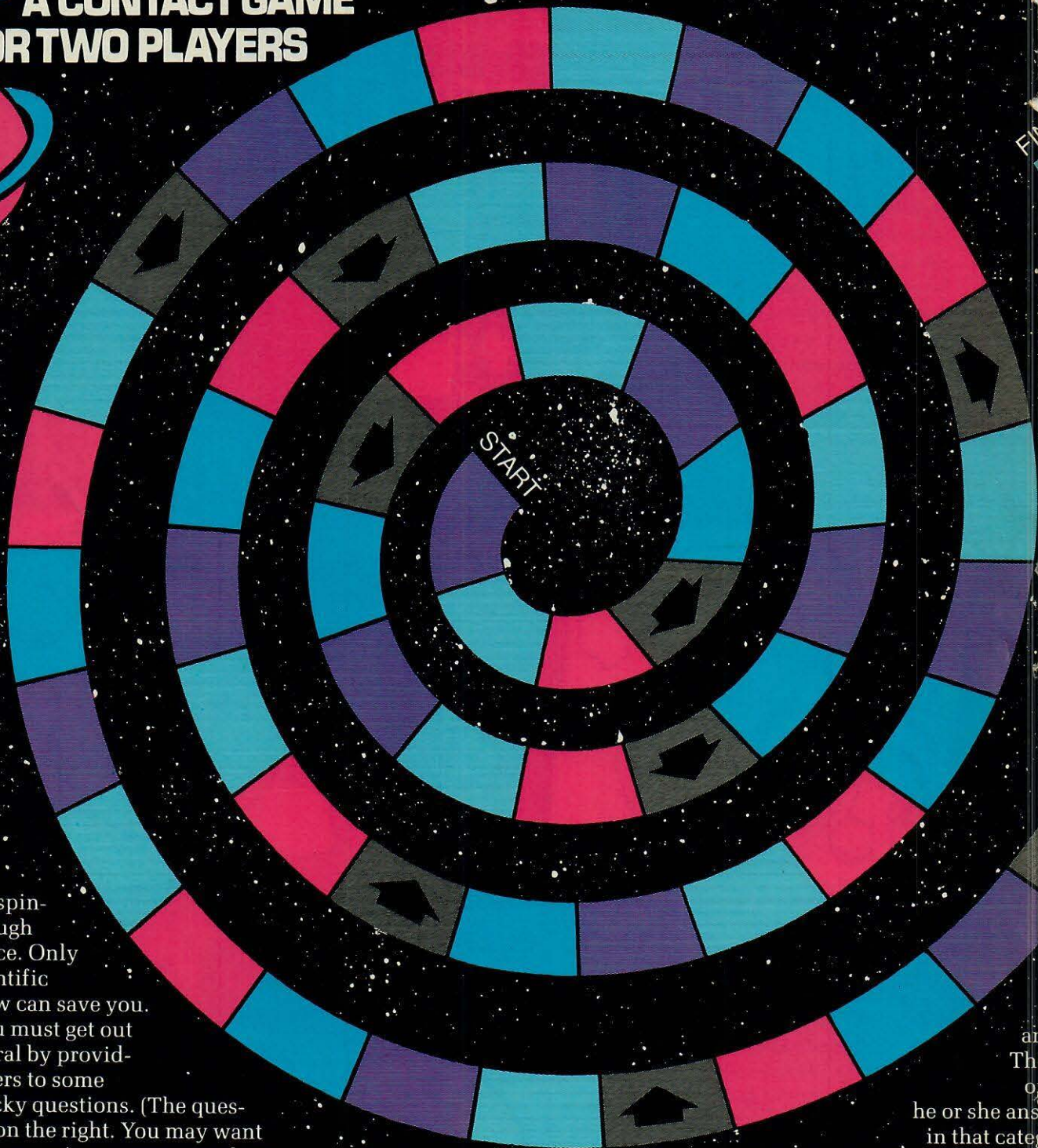


Room For One More October, November, December, Sol. Sol? What's Sol? It's not the name of a new kid in town. It's the name of the last month of a new calendar—the International Fixed Calendar. Each of its 13 months has 28 days. That adds up to a 364-day year. Since years have 365¼ days, an extra day is added at the very end. People haven't come up with a name for that day yet. Any suggestions?



Spiral Through Space

**A CONTACT GAME
FOR TWO PLAYERS**



You're spinning through outer space. Only your scientific know-how can save you. How? You must get out of the spiral by providing answers to some pretty tricky questions. (The questions are on the right. You may want to fold the questions over or cut them out.) There are four categories of questions. Each category matches a color along the spiral. Answers are on page 35.

To play, you will need the game board, one of a pair of dice, and a marker (a coin or button) for each player. Place markers on START. High roll of the die goes first. Players roll the die and move that number of spaces along the colored spiral in a counter-

he or she answers in that category. If you land on a gray square, follow the arrow. If your answer is wrong, the other player gets to throw and move again. If you land on a gray square, follow the arrow in the next ring. Answer the question in that category correctly, go again. If not your opponent goes to finish. To escape from the spiral, you must



WISH

clockwise direction. Take turns moving. When a player lands on a space, he or she must answer that color question. The next time a player lands on any square of that color, he or she answers the second question of that color, and so on. If you answer incorrectly, you roll again. The player goes. On your next turn, move to the color square of that category. If you answer correctly, continue until you get the exact number.

ILLUSTRATION © RICK SPAIN

Categories

Living Things

1. How many legs does a spider have?
2. Mammals breathe with lungs, what do fish use?
3. How does a chameleon hide from its enemies?
4. What was a brontosaurus?
5. **T or F** A colt is a young female horse.
6. Why do you count the rings of a tree trunk?
7. **T or F** The cheetah is the fastest animal.
8. What do you call a baby rabbit?
9. In which country do pandas live?
10. When birds fly south it's called _____.
11. What is the world's tallest animal?
12. Which endangered animal is the U.S. symbol?
13. Which animals build dams for homes?
14. **T or F** Bulls hate red.
15. Why do pigs roll in the mud?

Bright Ideas

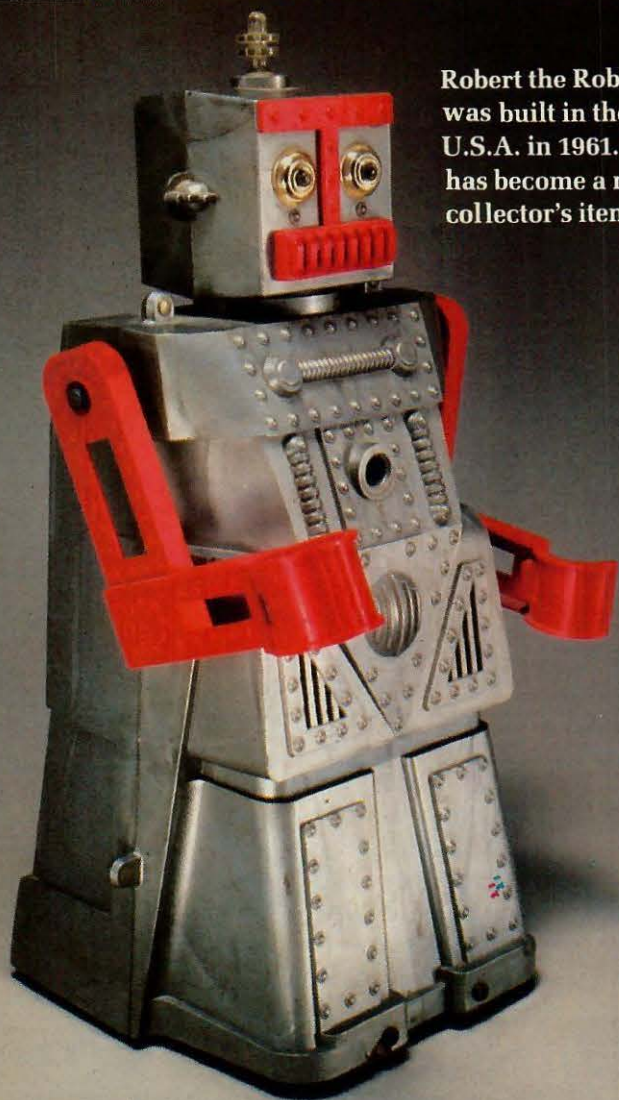
1. What is Alexander G. Bell's most famous invention?
2. The woman who discovered radium was _____.
3. Who invented the airplane?
4. What invention made the stars look closer?
5. **T or F** Samuel Morse invented the Morse Code.
6. Which of these did not exist before 1900? The airplane, the typewriter, or the movie camera?
7. Who invented the first light bulb?
8. **T or F** Lasers are beams of sunshine.
9. Who used a key and a kite to test electricity?
10. **T or F** Michael Jackson invented the record.
11. **T or F** Columbus discovered ice cream.
12. **T or F** When the pioneers moved West, they used Route 80.
13. What do you call R2-D2 and C3P0?
14. **T or F** Breakdancing means tripping over broken plates.
15. What's another name for moving stairs?

You and Your Body

1. There are 206 in your body. You couldn't stand alone without them. What are they?
2. Which muscle moves blood through your body?
3. What does a temperature of 98.6° F mean?
4. What do you call the 20 digits of your body?
5. What liquid makes up 2/3 of your body?
6. What is the purpose of sweating?
7. **T or F** "Hart to Hart" is a new type of transplant.
8. How big is your heart?
9. Does being double jointed mean you have more joints than other people?
10. **T or F** Bacteria in your mouth cause cavities.
11. **T or F** All people with red hair get angry easily.
12. What kind of beans do kidneys look like?
13. **T or F** More people are left-handed than righthanded.
14. Which organ tells your body what to do?
15. **T or F** Colds are caused by viruses.

Earth and Sky

1. What star is closest to earth?
2. **T or F** Llama is liquid rock from volcanoes.
3. Name a planet known for its rings.
4. What planet is closest to the sun?
5. Name the longest river in the U.S.
6. Another name for a twister is _____.
7. What happens when the moon blocks the sun?
8. Name the farthest planet from the sun.
9. Who was the first person to walk on the moon?
10. What sank the ship Titanic?
11. Name the lowest point in the U.S.
12. Name the four directions on a compass.
13. What do you call the human-made objects orbiting earth?
14. **T or F** The earth is a satellite of the moon.
15. About how long does it take earth to orbit the sun?



Robert the Robot was built in the U.S.A. in 1961. He has become a real collector's item.

PHOTO COURTESY OF AMERICAN CRAFT MUSEUM

Below: Meet Maxx Steele. This robot toy is two feet tall. It can be controlled either by radio or by a programmable memory system. Its three-wheeled base lets it move around easily. One arm has a magnetic disk to pick up steel parts. This toy is one of the newest and most adaptable robots. It walks, talks, and plays games.

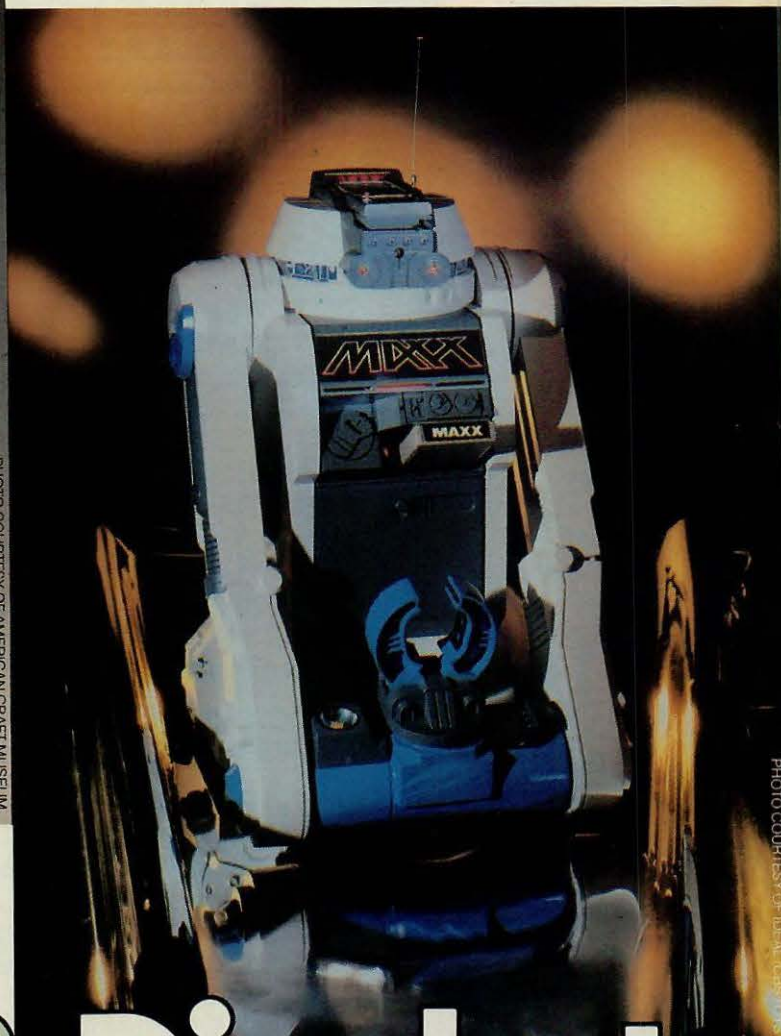


PHOTO COURTESY OF IDEAL TOYS

Robots, Gobots & Dingbots

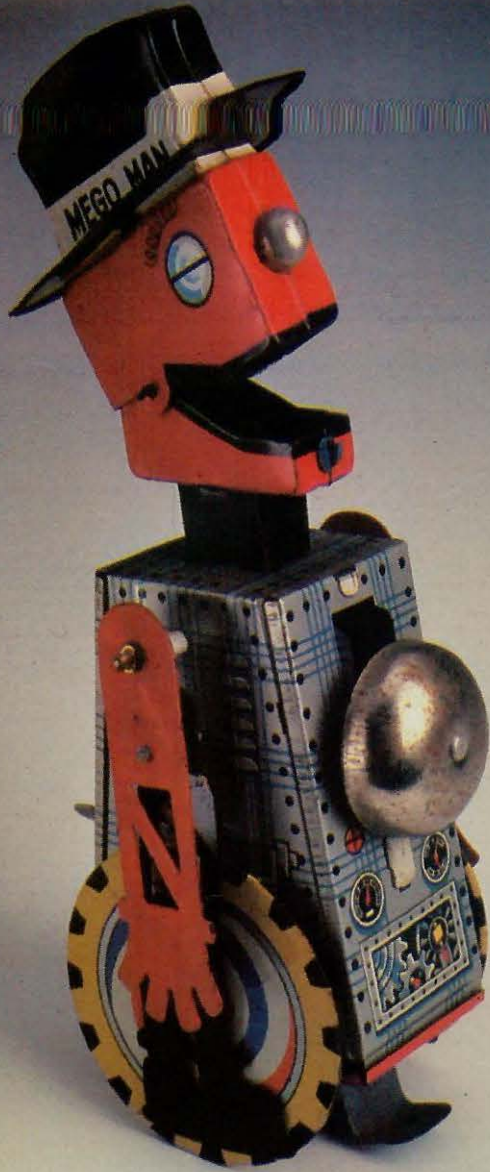
Watch out! The robots are coming—toy robots, that is! If you've been to a toy store lately, you've probably noticed that they are flooded with robots of all shapes and sizes. According to Christopher Byrne, an official with the toy industry, "Toys that look or act like robots are the latest fad. They're really taking off!"

"Toys always reflect what's happening in the real world," Douglas Thomson, who works for a toy group, told 3-2-1 CONTACT. "Robots used in factories and on the space shuttle have helped

lead to the making of robot toys. And movie robots—especially C3PO and R2-D2—have made robots really popular."

Most people who are experts in robotics—the science of robots—say a robot must pass three tests: It must be mechanical. It must perform certain jobs that it is programmed to do. And it must be able to make some choices by itself.

Most of the toys that you'll see in stores don't entirely pass these tests. The toys may be fun to play with. And they may be super to look at. But



Above: Mego Man from Japan, might better be called Mego Mouth. It was made in the 1950s.

Below: This movie star needs no introduction. But just in case you've been on Mars for the last few years, it's C3PO from the movie, "Star Wars".



PHOTO COURTESY OF LLOYD RALSTON

PHOTO COURTESY OF AMERICAN CRAFT MUSEUM

TOYS THAT ARE WINDING UP ALL OVER

most don't do what a real robot could do. They usually don't perform tasks. And they can't make choices by themselves.

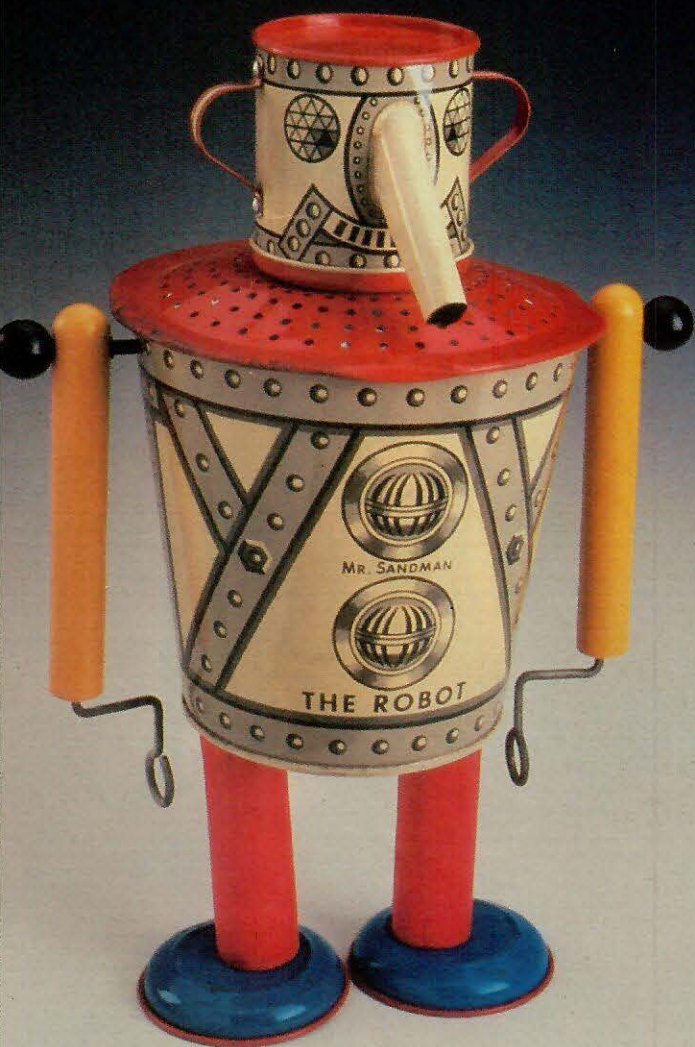
In the future, though, robot toys will probably become more developed. "As our technology gets better, I think the robots will be able to do more tasks. They may run on solar energy. And most will recognize voice commands," predicts Douglas Thomson. "Also the cost of making these more advanced toys will come down."

But even if the toys aren't all that advanced

right now, there's something that they can provide: valuable information!

People use toy robots—and other toys—to learn, just as books help people learn. Books talk about how things work. Toys are items that you can touch, feel, and try out. They can help people understand how science works.

"If you took a toy robot apart, you could learn all about how gears work, for example," says Charles Roberts, an engineer. Or you might figure out how batteries help turn robots into ➡



Above: Mr. Sandman came from Japan sometime in the 1960s.

PHOTO COURTESY OF LLOYD RALSTON

mechanically-powered objects.

On a bigger scale, people often use toys as models to test science theories and ideas. One reason: They are much cheaper to build—and to experiment with—than big pieces of machinery. If a part is damaged while doing an experiment with a toy, the toy can usually be fixed or replaced cheaply. Not so for a machine.

Here's a look at some toy robots from past and present. Check them out and see how they've changed over the years. What do you think robots will be like in the future?

Below: Say hello to "Godsigma"—one of last year's hottest robots from Japan.



PHOTO COURTESY OF AMERICAN CRAFT MUSEUM

The Robots Are Coming!

If you're really into robots, the American Craft Museum has a show that may be just for you. It's traveling across the U.S. and may be coming to your area. The exhibit has working robots, pictures of robots, and books about robots. Visitors can even get to see some 75 toys going back to the 1940s.

Right now the "Robot Exhibit" is in Montgomery, Alabama. From there it goes to Miami, Florida; Houston and Dallas, Texas; Madison, Wisconsin; Sacramento and Los Angeles, California; and then to Chicago, Illinois, where it ends in July 1986.

Below: In a flash of the eye, these GoBots can become vehicles of some kind—aircraft, cars, tanks, locomotives. Oh yes—there are good GoBots and bad GoBots.

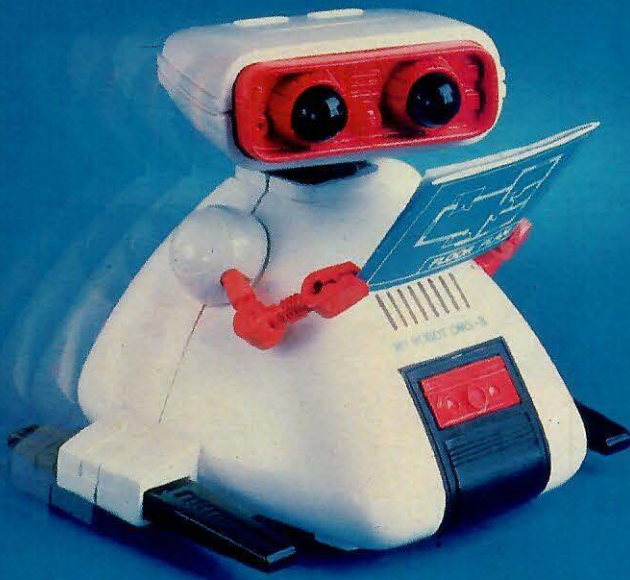


PHOTO COURTESY OF TOMY CORP

Above: Meet Dingbot. Dingbot is a map reader that needs some help. He is always bumping into objects. Each time he does, he turns and moves in another direction. It's enough to make you—um—bots in the belfry. The toy is battery-powered, and is far from a robot.

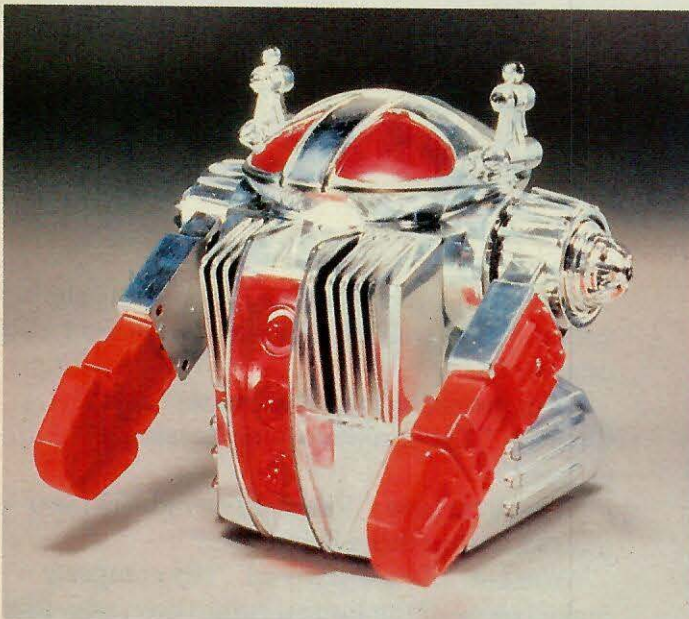


PHOTO COURTESY OF AMERICAN CRAFT MUSEUM

Above: Acrobot is a talented toy that does somersaults—as you've probably guessed from its name.

Right: Meet Nando. It's a Japanese toy made in the 1950s. How does it compare in looks with robot toys from 1984?

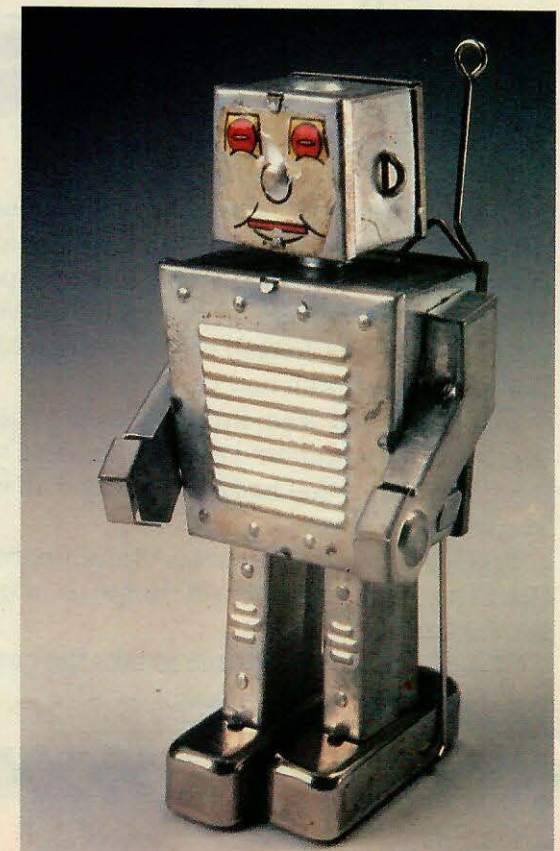


PHOTO COURTESY OF LLOYD RALSTON

The Bloodhound Gang



ILLUSTRATION © BRAD HAMANN

The Case of the Dirty Deal

by Michael J. Dayton

It was another slow day at the Bloodhound Detective Agency. The Gang had not had a case in over a week. Ricardo had his foot propped up on a chair. His left leg was in a cast. The week before he had challenged the ski trails at Mount Doom. Mount Doom had won.

Skip and Vikki were hunched over a chessboard. As Skip prepared to move a piece, something happened that hadn't happened all week. The telephone rang.

Vikki grabbed the receiver. "Bloodhound Detective Agency," she said. Her eyes lit up as she listened to the caller.

"Yes sir, I think we're free to take the case. We'll be there in half an hour."

Vikki hung up the phone. "All right!" she yelled. "That was John Rossmore. He's got a big case for us."

"You mean *the* John Rossmore?" asked Ricardo. "The one who owns Rossmore Games?"

"That's the one," Vikki answered. "Do you guys know anything about him?"

"You bet," Skip answered. "His company makes some of the hottest games around—like 'Trivial Triumph' and 'Trouble in Pair-A-Dice.'"

"Well, he wants us to come over," Vikki said.

"With my leg, I think it's a little far for me, especially in the snow," Ricardo said. "I'll stay here and hold down the fort."

When Skip and Vikki arrived at Mr. Rossmore's home, Vikki rang the doorbell. Someone yelled, "Come in—the door's unlocked."

Vikki and Skip walked through a hallway and entered a small den. Two teenagers, a boy and a girl, were sprawled on a couch. The girl was leafing through an encyclopedia. The boy was watching TV. But oddly, he was wearing headphones. A portable radio was clipped to his belt.

The two looked up. Skip said, "Hi, we have an appointment to see Mr. Rossmore."

"You've come to see Dad?" the girl asked. "Whatever for? Oh by the way, my name's Betsy. This loaf here is my brother Tom."

"Hello," said Tom, eyeing them curiously. "I'll bet you two are the detectives he wanted."

"How do you know?" Betsy asked.

"Uh, I'm pretty sure I heard Dad mention them earlier," Tom replied.

"Strange," mused Betsy. "I wonder why he wants to see detectives? Well, he's out back."

More Than Just A Game

Vikki and Skip went out the back door. As they approached Mr. Rossmore, a phone rang. He picked up a cordless telephone and spoke briefly to someone, then hung up.

"These cordless phones are terrific," he said to Vikki and Skip. "I still don't understand how they work without a cord."

"They're really quite simple, Mr. Rossmore," Skip said. "They work like a radio. A part inside the house has a transmitter in it. It takes the call and sends it to the part you're holding, the telephone. It has a receiver built into it. But basically it's like a radio. That's why it has that antenna on it."

Mr. Rossmore laughed. "Well, that does sound simple," he agreed. "And call me John."

"You have a case for us?" asked Vikki.

"I'm afraid I do. As you can guess, I love games. But I don't like it when someone tries to cheat me—especially my own family."

John explained that he had developed a new game. He called it "Spiral Through Space." It has a board and several boxes of cards. Each card has a science statement printed on it. The players decide whether the statement is true or false. Players get points for each correct answer.

"I came up with this game all by myself," he said proudly.

"About a month ago I decided to test the game on Tom and Betsy. I told them to brush up on their science. Today is the day I planned to hold the contest. And to make it more interesting, the winner gets a check for \$100."

Mr. Rossmore continued. "Each night I lock the game cards in my desk drawer. About two weeks ago, I noticed something strange. There were deep scratch marks around the lock. And the wood was cracked and splintered."

"As though someone tried to pick the lock or pry open the drawer?" Vikki asked.

"Exactly," John replied. "In any case, someone looked at some of the cards. But that's not the point. I've raised my children to be honest. If one of them is cheating, I want to know about it. I want you to find out who it is. And whatever you do, don't tell them you're detectives!"

Something's "Phoney"

"We didn't have to tell them," Vikki said. "They already knew."

"Tom said he heard you talking," Skip added.

"How can that be?" wondered John. "I called you from out here. As far as I know, I hadn't mentioned anything about you to either one."

Vikki was thoughtful for a moment. "Tell me, John. How did you research your cards?"

"Well, I know a lot about science myself. I wrote most of the questions. But I did call a science teacher. She gave me some questions. She also told me which books might be helpful."

Vikki stared at the cordless phone. "Did you make your phone calls from that phone?"

"Of course," Rossmore replied.

Skip looked at Vikki. "Do you think this phone is bugged?" he asked.

"Not bugged, exactly," she replied. "John, may I use that phone? I'd like to call our office."

"Certainly," he replied.

Vikki rang Ricardo at the office.

"Bloodhound Detective Agency," Ricardo answered.

"Ricardo, this is Vikki."

"How's the case going?" Ricardo asked.

"Not so great," she replied. "There's \$100 at stake this afternoon. But so far we don't have a clue. All we know is that all that money will be won by the person who can answer a question."

"What's the question?" Ricardo asked.

"Answer this true or false: 'Penguins live at ➡

the North Pole.' ”

“Well, that’s easy,” Ricardo said without hesitating. “Everyone knows that’s false. Penguins live at the South Pole.”

Vikki laughed. “Wrong! A colony of penguins was recently discovered at the North Pole. We’ll talk to you as soon as we know more. See ya.”

Rossmore shook his head in amazement. “I have a card with that very question. I haven’t heard anything about penguins at the North Pole.”

“That story does sound fishy,” Skip said.

“That’s because it is,” Vikki said with a smile. “And we’ve just baited the hook.”

The \$100 Dollar Question

John went to call Betsy and Tom. Everyone gathered in John’s den. Vikki asked John if she could read the questions. He agreed.

Vikki stood at the front of the room with the cards. Tom and Betsy sat in chairs that faced her. Betsy had left her book behind. Tom still had the stereo headphones hanging around his neck. The radio was still clipped to his belt.

“Let’s get going,” called out Tom. “I’m ready to win today.”

“Over my dead body,” Betsy said.

“Okay, I can see we’re ready to start. The first question is for Tom. In the southern hemisphere, the summer solstice occurs around June 21 or June 22. True or false?” Vikki said.

“False,” Tom said quickly. “That’s when the winter solstice occurs.”

“Correct,” Vikki said. “Now Betsy, Alexander Fleming discovered penicillin. True or false?”

“True,” she replied.

“Very good,” Vikki said. “Tom, the three major classes of rocks are igneous, metamorphic, and sedimentary. True or false?”

“True,” Tom answered.

Now Vikki set her trap.

“Betsy, penguins live only at the South Pole. True or false?”

“That’s true,” Betsy replied.

Suddenly Tom jumped to his feet. “That’s false!” he beamed.

“What do you mean false?” Betsy demanded. “I know for a fact that the card says...”

John broke in. “Just what does the card say?” he demanded. “So you’re the one who broke into my desk and looked at the game cards!”

Betsy blushed. She hung her head in shame but offered no apology.

“Hooray!” Tom yelled. “I’ve finally won a game around this place!”

“But Betsy was right,” Vikki said. “This card says the correct answer is true.”

“Uh-uh,” Tom said. “I heard on the radio that penguins were discovered at the North Pole.”

“You may have heard that story on the radio, but you weren’t listening to any news program.”

“What do you mean?” asked Tom suspiciously.

“I wondered why you were listening to those headphones earlier—even while watching TV,” Vikki said. “Now I know. You can pick up your father’s cordless phone on your radio!”

“Of course!” Skip said. “That phone sends out an FM signal. So it’s possible to pick it up on a radio. You just have to find the right spot on the dial. That explains how he knew we were detectives—and how he heard the penguin story.”

John stared at his son and daughter. “But I don’t understand. Why did you do this?”

Tom replied angrily, “I’ll tell you why I did it. Being a good sport around here means the same as losing. Ever since I was three, you’ve beat me and Betsy in every game we ever played. Now I wanted to beat you at your own game.”

“B-but it’s just a game,” stammered John.

“Not to you, Dad,” Betsy said. “You take all these games so seriously. And you made this one even worse by offering that prize money.”

John was silent for a moment. “You’ve given me a lot to think about. I’m sorry.”

“Let’s forget it. We were all wrong,” Tom said. “It’s time for the family to go outside and have a good old-fashioned snowball fight!”

“You’re on!” John laughed.

COMING NEXT MONTH

**The Case of
the Stagestruck
Elephant**

Coming Attractions

What's Your Guess?

At the end of a year, many people make predictions—guesses—about what's ahead in the year to come. CONTACT decided to look even further ahead. We asked several experts to predict what life might be like in 1995. Here's what they have to say:



Michael
J. Fox

What's the future of TV programs?

"TV is going to be a lot better in the future than it is now," says Michael J. Fox of NBC-TV's "Family Ties".

Michael predicts that there will be many different types of TV shows. He says, "We might have a weekly show—a family show—that's four or five hours long with a lot of stories worked into one episode.

"I also think we're going to see channels just for comedy and channels just for drama. Also, viewers will probably receive hundreds of cable stations."

CONTACT asked Michael to guess which stars will be popular in 1995. "The actors and actresses who are good today are going to be around in 10 years," he predicted.

Does that mean you'll still be seeing Michael J. Fox on your TV screen in the future? Michael's biggest wish for television 10 years from now is that he'll still be a part of it!

What will it be like to live in a future home?

The trend towards smaller homes will continue in the 1990s. These nifty little homes may meet your needs so well that you may never—well almost never!—have to leave.

"For one of every six people, going to work may mean just sitting down at a home computer," says architect Roy Mason.

And through a special two-way system in your TV set, you'll be able to shop, do your banking, or "visit" your doctor—all without leaving home.

And at the end of a long day, you'll be able to bring the great outdoors indoors. It'll be easy. Just flash some computer pictures of waterfalls onto a wall or window. Then sit back and relax. Home sweet home of the future!



ILLUSTRATION © BRAD HAMANN

What jobs will be around in the 1990s?

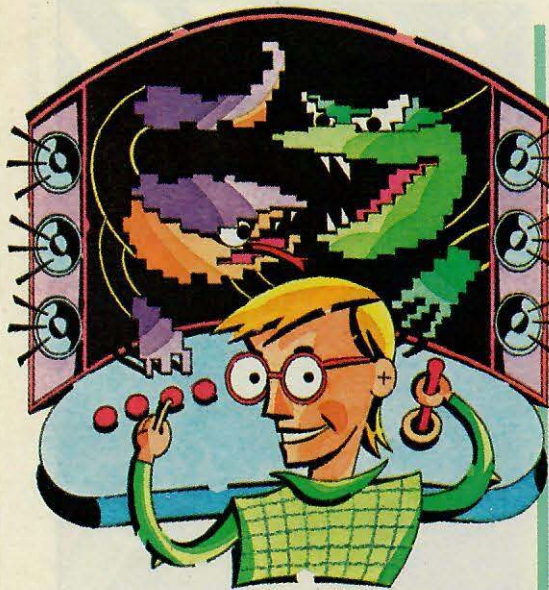
Here's a real way-out place to get a job—space! "Plenty of people who are good with a wrench or a hammer will be needed to keep America's first space station working," says Neil Rosenthal of the U.S. Department of Labor.

If you want to keep your feet planted on earth, however, experts predict that there will be plenty of other jobs. You could be a teacher, a person who works with older people, a fast food worker or a travel agent. These are just a few of the jobs that are expected to be hot.

And if you're into computers, you'll also be in luck. You could design video games for the home or software for schools. There will also be a need for computer programmers. And when computers break down, people will always be needed to repair them.

ILLUSTRATION © BARBARA HAMILIN

Coming Attractions



Will toys and games be any different in 1995?

By then kids will be playing with more and more computer toys and games, says Bernie DeKoven, a game designer. And kids will think nothing of playing with other kids who live thousands of miles away, thanks to computer hookups.

Will home video games still be popular? They sure will! For some of the games, you'll be surrounded by a wrap-around screen and speakers. It will be as though you're right in the action.

But the most way-out toys of all could be those that run on biofeedback. Some of them may have joysticks that will sense your brain waves or your heart rate. These toys will work faster or slower in response to your body rhythms.

Not all play that's connected to machines will involve just sitting around, though. For instance, a computer might help you play handball. When you hit the ball, the computer lights up the wall and registers your score!

What energy sources will people use in 1995?

If you pull up to a fuel pump in 10 years and say, "Fill 'er up," you might not get gasoline as you know it today. By then, more cars will be running on methanol and other fuel mixtures. Methanol is a fuel that people make from wood, coal, or natural gas.

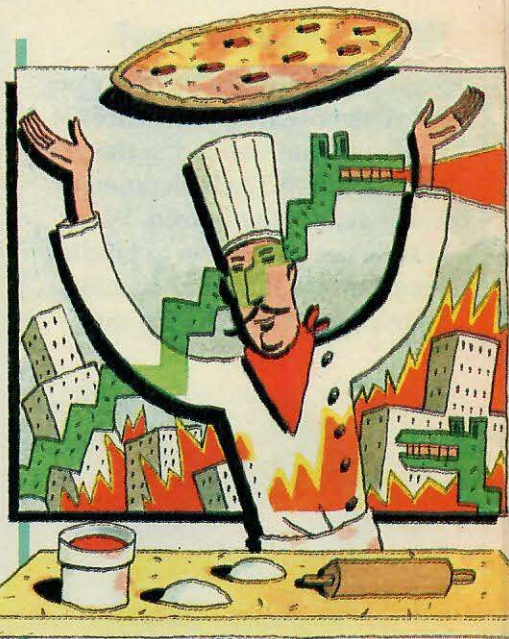
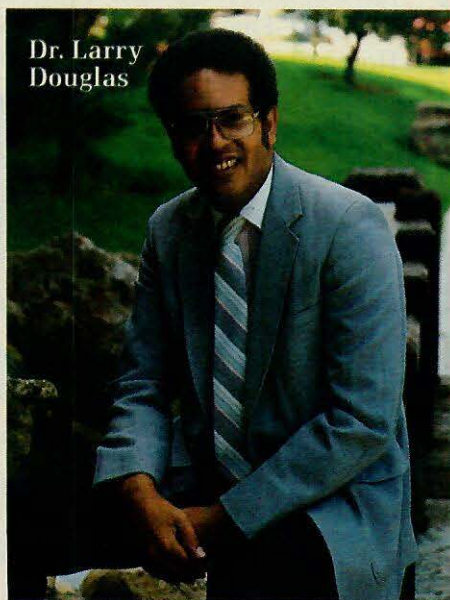
A greater variety of energy sources will also be available to heat homes and run factories. More and more people will be using wind power, thanks to giant windmills. Energy from the sun will be used more than ever, too. People may even find ways to make use of ocean tides and geothermal energy — heat from deep within the earth.

"Many of these fuels will come from sources which replace themselves in nature," says Dr. Larry Douglas of the Solar Energy Research Institute.

With all these fuels available, people may not have to worry as much about running out of energy in 1995 as they do now.

PHOTO COURTESY OF KATHLEEN DOUGLAS

Dr. Larry Douglas



What movie magic can you expect in the 1990s?

When you go out for a pizza, ribs, or other fast food in 1995, you may also get a 20-minute movie to go with it. The film will make you feel like you're right in the middle of the action.

Let's say that you're watching a scene where a car roars along at 110 miles per hour. The movie will make you feel as if you were actually traveling that fast.

The movies you see in theaters may be pretty exciting, too. Some movie screens will be huge—as high as a four story building and 66 feet wide. Other screens may surround you entirely. When you look to the front, you'll see objects coming at you. But when you look behind, other objects will be disappearing into the distance.

To make movies even more real, some will give you smells to match the sights you're seeing on the screen! Going to a movie of the future might be a real sense-sational experience.

What will schools be like in the future?

The classrooms of today will still be around in 10 years. (Sorry, kids!) And they'll still be filled with teachers and students. The school day will be about as long as it is today. Reading, writing and arithmetic will still be taught, too—but more and more kids will be using computers to learn these subjects.

"Since computers will help students to learn at their own speed, some kids will be so far ahead in their studies that they may even teach their teachers!" says Larry Davidson, a school principal.

Even classes in art will be taught with the help of computers. Kids may find that the machines make creative work easier and less messy. For instance, if you're drawing and make a mistake, just press the "delete" button and start over.

How will space be used in 1995?

The United States may have a space station in earth orbit in 10 years. The station will be used as a factory. It will be especially good at making silicon crystals to use in computer chips.

"On earth, crystals can develop tiny cracks caused by gravity," explains G. Harry Stine, a rocket expert. "But in space, you can make almost perfect crystals."

Stine thinks that space factories will be a great new development. For one thing, they'll help

free the earth from polluting smokestacks. And they'll make products that can't be made here.

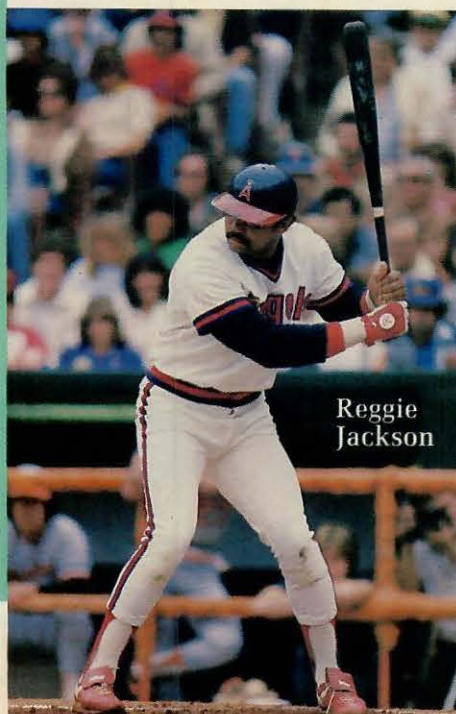
"On earth you can't mix certain metals because gravity causes them to separate like oil and vinegar," says Stine. "But in space, once you mix the 'dressing,' it stays mixed forever."

So in the future, some products you buy may not say "Made in U.S.A." but "Made in Space!"

Will sports still be popular in 10 years?

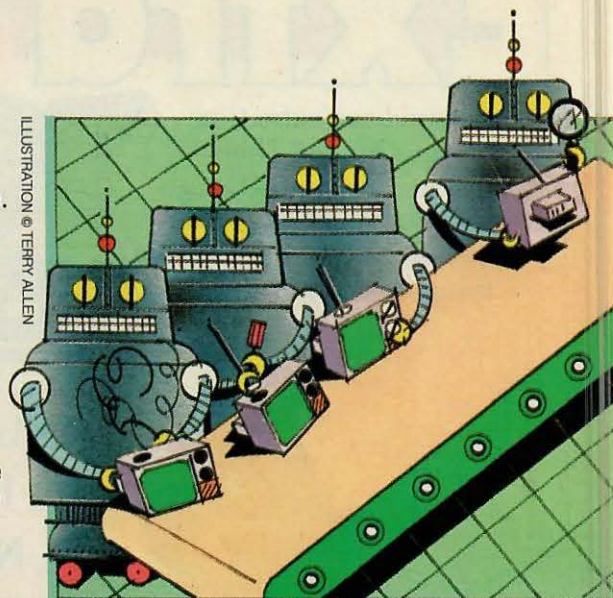
"Sports will be more popular than ever, especially with the growth of cable television," Reggie Jackson told CONTACT. Then people will be able to see more types of sports on TV.

"More and more athletes will be heroes to kids in the future," predicts Jackson. And to say thanks for the kids' support, he thinks athletes will make a big effort to be the kinds of heroes that kids can look up to.



Reggie Jackson

ILLUSTRATION © TERRY ALLEN



How will robots be used in the future?

Not as handy helpers in your home, says John Hollerbach, a robot expert. "Robots won't be able to move around well enough by 1995 to be really useful in your home."

But robots will be important in factories. They will be able to "see" much better than today's 6,000 working factory robots. Over 100,000 robots will use their improved vision systems to put together all kinds of products from cars and TV sets to microwave ovens. And other robots will be the chief inspectors of the finished products!

Contest! Contest!

What are your predictions for 1995? We want to hear from you! Let us know what you think life will be like in 10 years. We'll print some of your answers. Send your predictions to:

3-2-1 CONTACT Predictions
P.O. Box 599
Ridgefield, NJ 07657

PHOTO COURTESY OF THE CALIFORNIA ANGELS/LOU SAURITICH

Extra!

Do you have extra time on your hands? Then this month's *Extra!* is just right for you. Check out all the fun things to do!

by Rebecca Herman

Robot Hunt

Where does a robot save its money?

Do you want to find the answer to the riddle? First find all the robots that we've hidden here. They go across, up and down, and diagonally. When you're done, write down the uncircled letters, from left to right. That will give you the answer.

Word List

CHARLEY	LEACHIM	TOBOR
ESRI	ORION	UNIMATE
GORT	ROBBY	V.I.N.CENT

Answer:

For the Birds

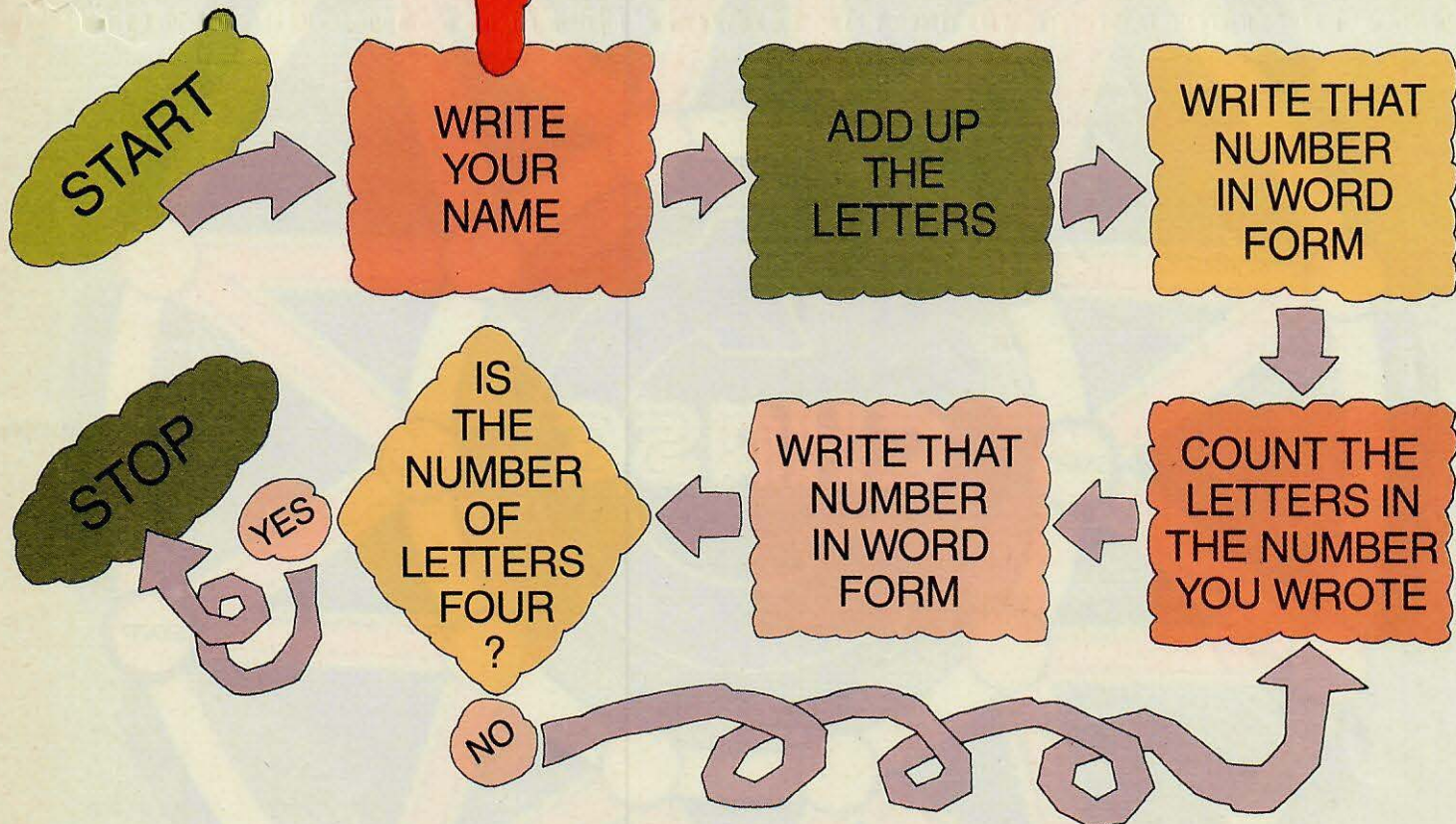
You may be warm this winter, but some birds are roughing it in the cold. They're having a tough time finding food. You can help.

Just send for "Recycle for the Birds". This pamphlet will tell you how to turn food containers into bird feeders. Write to:

National Wildlife Federation
Dept. 60
1412 16th St., NW
Washington, D.C. 20036

Just **4** You

Whether your name is Isidore or simply Sue, it adds up to four. If that doesn't quite compute, follow this flow chart and see what we mean.

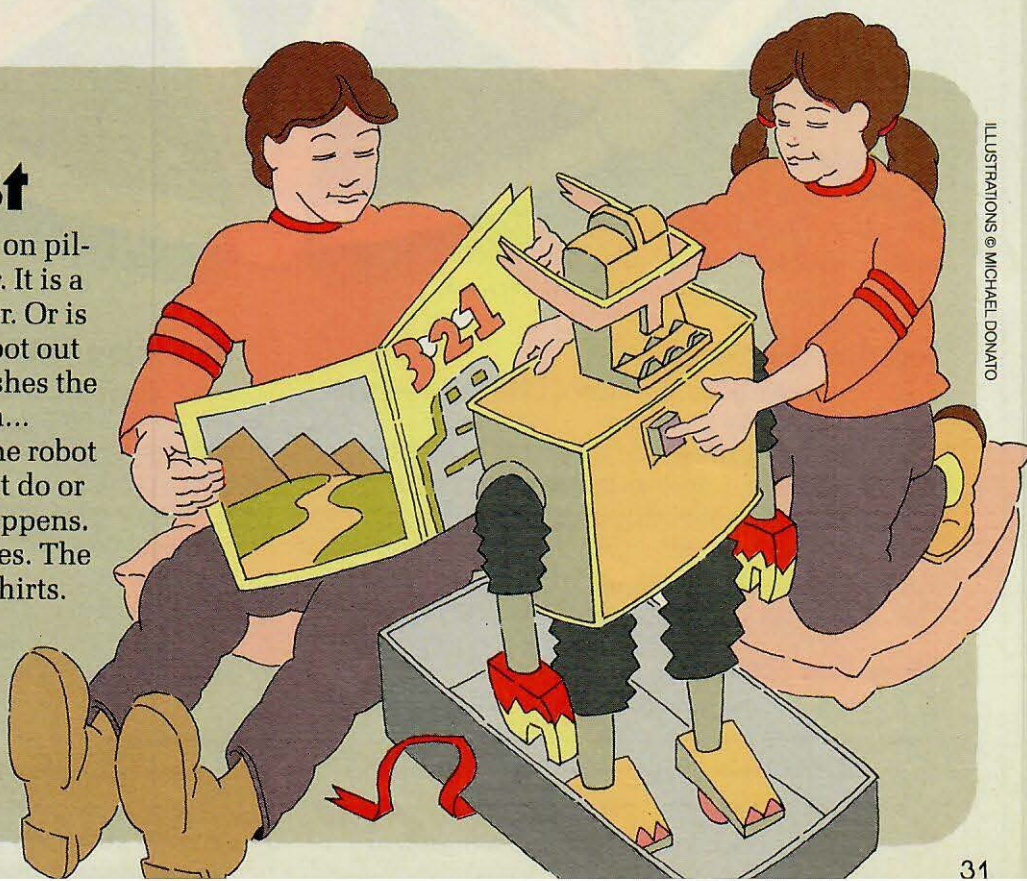


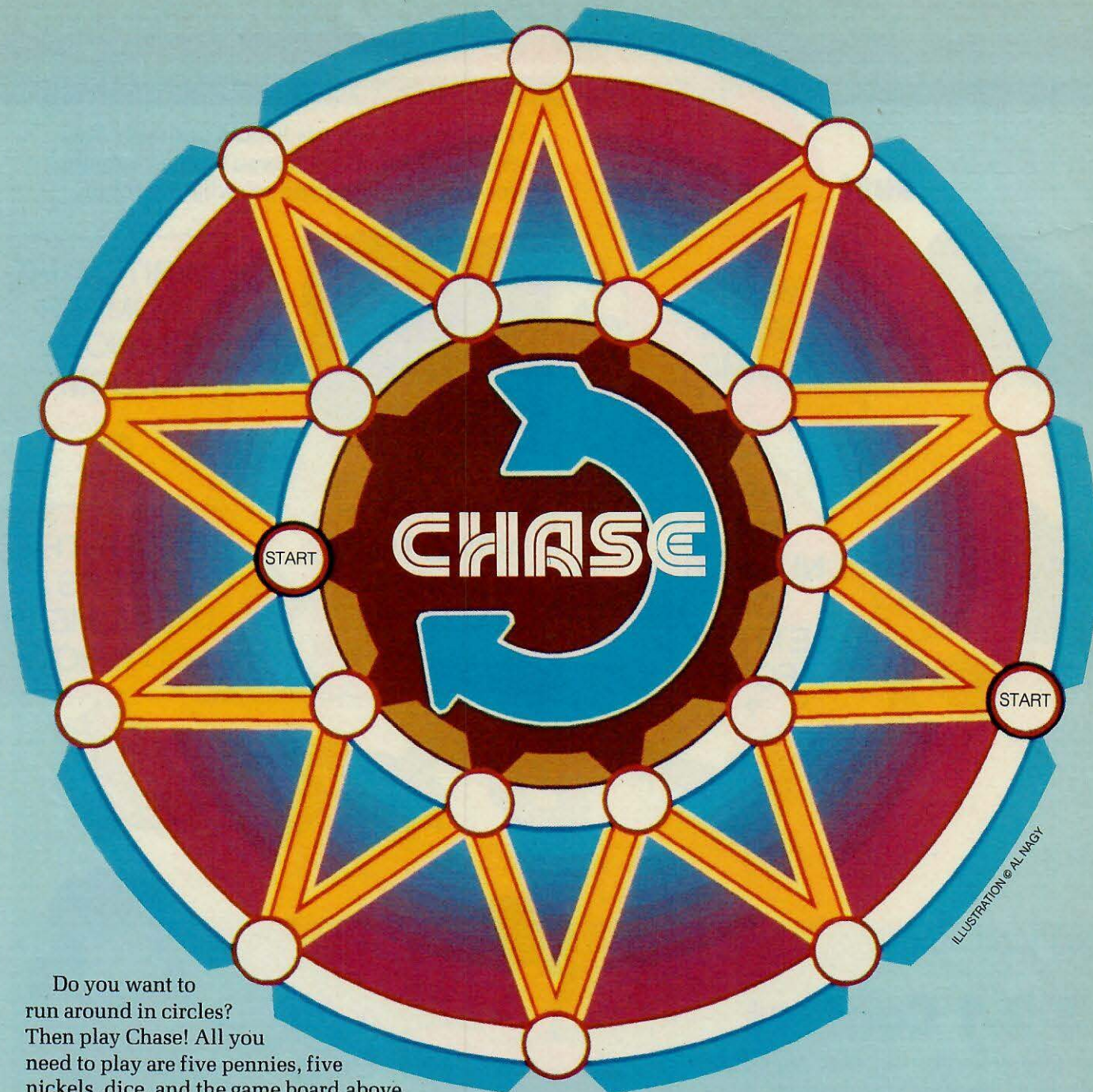
3-2-1 Contest

Danny and Laura are sitting on pillows in the middle of the floor. It is a holiday morning like any other. Or is it? Laura takes her new toy robot out of its shiny silver box. She pushes the toy robot's switch to ON. Then...

What happens next? Does the robot come to life? If so, what does it do or say? Tell us what you think happens. We'll choose our favorite stories. The writers will get CONTACT T-shirts. Send your entries to:

3-2-1 Contest: Robot
P.O. Box 599
Ridgefield, NJ 07657





Do you want to run around in circles? Then play Chase! All you need to play are five pennies, five nickels, dice, and the game board above.

Starting the Game

- ★ Two people play. One uses five dimes as pieces, the other uses five pennies.
- ★ Roll one die to see who goes first. The highest number starts and chooses between two paths.
- ★ One player moves only on the white circles. The other uses only the yellow zigzag path between them. Each path has advantages. The circles move faster. But the zigzags can slide from one circle to the other.

How You Move

- ★ Throw the die to see how many spaces to move. Take turns moving in a clockwise direction.
- ★ Pieces enter at the two spaces marked START.
- ★ Begin counting after the start space.
- ★ You may move a piece already on the board or you may start a new one.

Capturing Your Opponent

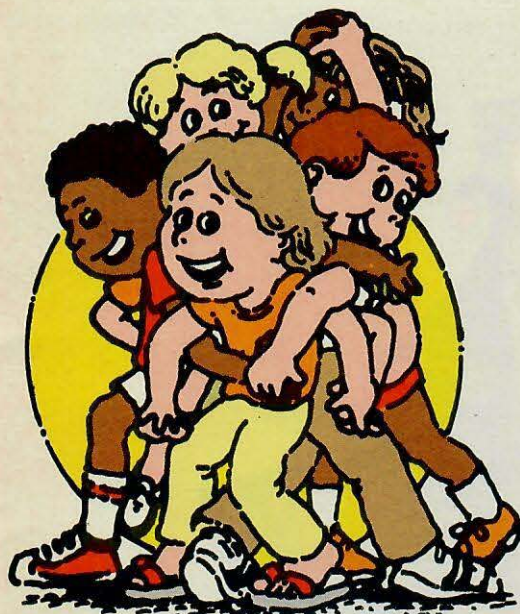
- ★ You capture your opponent's piece by landing on the space where it is sitting. Remove the piece. To capture, you must land exactly on the space, not just pass over it.
- ★ If two or more of your pieces are on one space at the same time they are SAFE. They can't be captured.
- ★ You cannot land on another person's SAFE space. If you see that one of your pieces will land on a safe space, you must move another piece. If you only have that piece left to move, you lose a turn.

Winning

- ★ The winner is the one who captures all of the other player's pieces. As you play, figure out the best strategy. After you play, switch paths with the other player and see what happens!

MAIL

Games Readers Play Looking for something to do on a rainy day? How about playing games? We asked for your favorites in our March 1984 issue. So you can thank some of our readers for the ideas.



The Human Knot

To play this game called the "Human Knot," you will need at least five people, but up to 20 can play. Everybody gets in a circle and you hold hands with two different people. Don't hold hands with the people on either side of you. Now without letting go of hands, try to untangle the knot and form a circle again. You'll have to squirm and turn to "untie" the knot—and still remain in a circle.

Doreen N. Peterson, Johnson City, NY

Busy As a Bee— Oops Ant!

I have a sport that I play *all* the time. My mom invented it. It is called "Ant". You pick up dirty clothes and put them in the hamper, then you clean your room, set the table and clear the dishwasher. It is called "Ant" because we are kept busy all the time.

Shireen Dickson, Mitchelville, MD

Jog Your Memory

Each player needs a pencil and paper. Put 10 objects in a pan and cover the pan with a towel. Take the towel away and let everyone look at the objects for 30 seconds. Cover the pan again. Players write down the names of the objects they remember. The person who remembers the most wins.

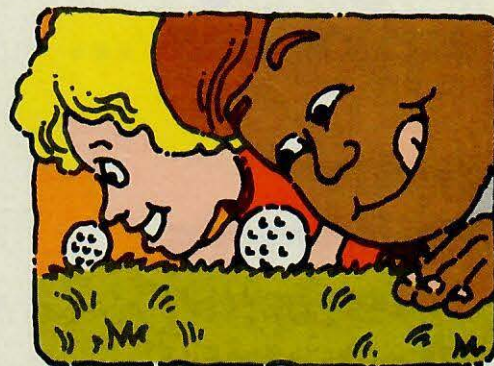
Lisa Mather, Pacifica, CA



Cents and Non-Cents

You put a penny on the floor between two players. Throw a ball at the penny. If you hit the penny you get one point. You get two if the ball turns the penny over.

Douglas Pravda, Scarsdale, NY



ILLUSTRATIONS © RON LEFKING

Nosing Around

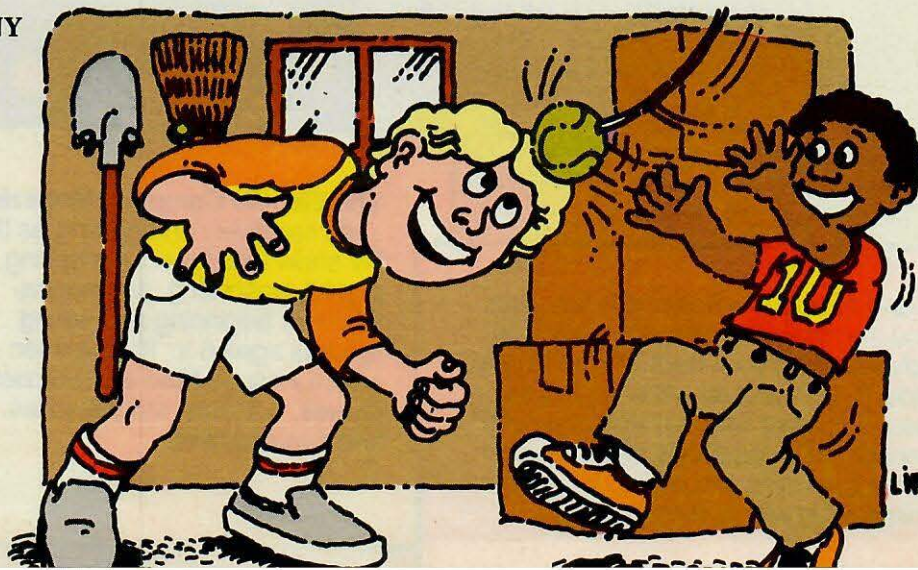
My friends and I made up a new game. It's just like the wheelbarrow race, but you roll a golf ball with your nose.

Jon Lefler, Arlington, TX

Noodle Ball

My dad has a tennis ball hanging from the ceiling of the garage so he can tell how far in to park his car. When he is gone, my friends and I like to hit the ball to each other with our hands. Sometimes we use our heads. It is a lot of fun to see how long we can keep the ball going.

Jonathan Thornhill, Lubbock, TX



HOLIDAY FUN

**Gifts that keep
on giving for the
entire year...**

**from
Children's
Television
Workshop**



Sesame Street Magazine—Big Bird and his delightful friends bring dozens of playful surprises, ten terrific times a year. (It's the entertaining education that Sesame Street does best!) Puzzles, cut-outs, games, A-B-C's, 1-2-3's, ... there's all the magic of the TV super-series in every colorful issue.

3-2-1 Contact—Science is fun. And you can make it a year-long learning adventure for your favorite 8 to 12 year-olds. 3-2-1 Contact will bring ten big issues packed with puzzles, projects, experiments, questions and answers about the world around us. It's an involving, fun way to learn!

The Electric Company Magazine—as creatively entertaining as the TV show kids love. It's amusing, playful, absorbing, and educational for beginning and young readers ages 6 to 10. Enjoy ten colorful issues filled with puzzles, games, cut-outs, stories, jokes... and sunny smiles.

Enter Magazine. The fun way for your child to learn computer skills, understand computer technology, and keep up on computer games and news. A one year subscription (10 issues) brings programs for all home computers, quizzes, puzzles, and features that involve your 10 to 16 year-old and encourage him or her to become a competent computerite. And you don't need a computer in your home to make it work!

Did It!

Video Star Gazing (page 2)

The matches are A-G, D-I, F-K, H-C, J-E, and L-B.

Spiral Through Space

(pages 18-19)

Living Things:

1. Eight; 2. Gills; 3. Camouflage—changes colors; 4. Dinosaur; 5. F, a young male horse; 6. To find its age; 7. T; 8. Bunny; 9. China; 10. Migration; 11. Giraffe; 12. Bald eagle; 13. Beavers; 14. F, they're colorblind; 15. To keep cool.

Bright Ideas:

1. Telephone; 2. Marie Curie; 3. Wright Brothers; 4. Telescope; 5. T; 6. Airplane; 7. Thomas Edison; 8. F, beams of light; 9. Benjamin Franklin; 10. F, but no one sells more; 11. F, but we'd like to thank the person who did; 12. F; 13. Robots; 14. F, but watch out for broken backs; 15. Escalator.

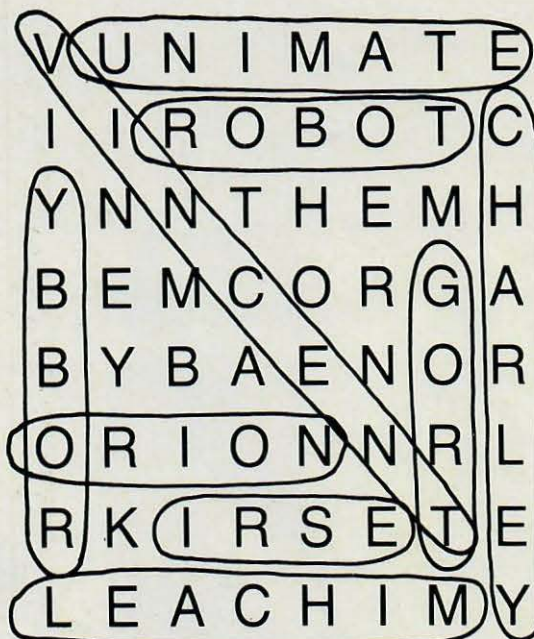
You and Your Body:

1. Bones; 2. Heart; 3. Normal body temperature; 4. Fingers and toes; 5. Water; 6. Keeps you cool; 7. F, a TV show; 8. Size of your fist; 9. No, you can move your joints more easily; 10. T; 11. F, No more easily than anyone else; 12. Lima beans; 13. F, more righthanded people; 14. The brain; 15. True.

Earth and Sky:

1. Sun; 2. F, lava; 3. Saturn; 4. Mercury; 5. Mississippi River; 6. Tornado; 7. An eclipse; 8. Pluto; 9. Neil Armstrong; 10. Iceberg; 11. Death Valley; 12. North, South, East, West; 13. Satellites; 14. F, The moon is a satellite of earth; 15. 365 1/4 days (one year).

Robot Hunt (page 30)



The answer to the riddle is:
IN THE MEMORY BANK

Next Month!

Here's a sample of what you'll find in the next issue of 3-2-1 CONTACT:

Good Grief!

Come along as CONTACT visits the people who bring the Peanuts cartoon gang to life.

Life at the Bottom

Meet some of the people who live and work at the South Pole.

**Plus Factoids, Puzzles,
Letters and More!**

Contact Lens



PHOTO, INTERNATIONAL STOCK PHOTO © NORRIS CLARK

Snow Surfin'

There's water skiing and snow skiing. And of course there's ocean surfing. But snow surfing? That wishful idea was dreamed up by some people who live in chilly, snowy McCall, Idaho.

Every year, when the days are at their shortest, McCall has a winter festival. The town's residents get together and mold giant statues out of snow and ice.

This ice statue of a California surfer (complete with wave), may be McCall's way of hurrying up summer.

3-2-1 CONTACT
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